	Type	L #	Hits	Search Text	DBs	Time Stamp	Comments	Error Definition	Errors
1	IS&R	L1	2	("3966422").PN.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/03/10 16:36			

	Type	L #	Hits	Search Text	DBs	Time Stamp	Comments	Error Definition	Errors
1	BRS	L1	4557	(428/668 or 428/679 or 428/926 or 420/435 or 420/436 or 420/437 or 420/438 or 420/439 or 420/440 or 148/408 or 148/425 or 148/442 or 148/530).ccls.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/03/10 12:21			
2	BRS	L2	352	1 and (cobalt or co) and (chromium or cr) and (tungsten or w) and (silicon or si) and carbon and (nickel or ni) and (iron or fe) and (manganese or mn) and (molybdenum or mo)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/03/10 12:23			
3	BRS	L3	187	2 and (layer or coating or coatings or layers)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/03/10 12:24			

	Type	L #	Hits	Search Text	DBs	Time Stamp	Comments	Error Definition	Errors
4	BRS	L5	16	4 and (plating or plated)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/03/10 13:02			
5	BRS	L4	84	3 and (turbine or turbines or blade or blades)	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/03/10 13:01			
6	BRS	L6	2	JP-11336502-$.did.	US-PGPUB; USPAT; USOCR; EPO; JPO; DERWENT; IBM_TDB	2005/03/10 13:04			

	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
1			US 20040106000 A1	20040603	6	Cobalt-based alloy for the coating of organs subject to erosion by liquid	428/668	420/436; 427/595
2			US 20040091639 A1	20040513	7	Method for treating organs subject to erosion by liquids and anti-erosion coating alloy	427/595	420/440
3			US 6746782 B2	20040608	9	Diffusion barrier coatings, and related articles and processes	428/632	204/192.15; 420/37; 420/428; 420/430; 420/432; 420/433; 420/437; 420/448; 420/588; 420/82; 427/250; 427/405; 427/455; 427/531; 427/596; 428/336; 428/655; 428/656; 428/675; 428/678; 428/680
4			US 5888316 A	19990330	28	Nickel-cobalt based alloys	148/410	148/419; 148/428; 148/442; 420/448; 420/588
5			US 5637159 A	19970610	28	Nickel-cobalt based alloys	148/410	148/419; 148/428; 148/442
6			US 5476555 A	19951219	28	Nickel-cobalt based alloys	148/410	148/419; 148/428; 148/442

	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
7			US 5242511 A	19930907	12	Copper alloy compositions	148/430	148/432; 148/442; 252/511; 252/514; 420/497; 420/502; 420/587
8		X	US 4556607 A	19851203	8	Surface coatings and subcoats	428/627	106/286.3; 106/286.4; 148/425; 148/427; 148/442; 420/442; 428/679
9			US 4241147 A	19801223	5	Diffusion aluminized age-hardenable stainless steel	428/652	427/405; 428/651; 428/679; 428/926
10			US 4153453 A	19790508	6	Composite electrodeposits and alloys	420/94	205/109; 205/228; 205/67; 205/69; 205/70; 420/435; 420/436; 420/441; 420/442; 420/459
11			US 3829969 A	19740820	9	CUTTING TOOL WITH ALLOY COATED SHARPENED EDGE	30/346.54	204/192.16; 30/346.53; 420/424; 420/427; 420/428; 420/430; 420/461; 428/656; 428/670; 428/926; 428/932

	U	1	Document ID	Issue Date	Pages	Title	Current OR	Current XRef
12			US 3819338 A	19740625	4	PROTECTIVE DIFFUSION LAYER ON NICKEL AND/OR COBALT-BASED ALLOYS	428/652	428/670; 428/678; 428/926; 428/938; 428/941
13			US 3764371 A	19731009	6	FORMATION OF DIFFUSION COATINGS ON NICKEL CONTAINING DISPERSED THORIA	427/253	148/240; 428/668; 428/680
14			US 3677789 A	19720718	3	PROTECTIVE DIFFUSION LAYER ON NICKEL AND/OR COBALT-BASED ALLOYS	148/527	205/191; 205/194; 205/228; 427/205; 427/250; 427/376.8; 428/668; 428/670; 428/680
15			US 3077285 A	19630212	20	Tin-nickel-phosphorus alloy coatings	220/62.17	384/276; 384/912; 428/34.1; 428/457; 428/648; 428/679; 428/926; 428/938
16			US 2731403 A	19560117	5	Manufacture of nickel-plated steel	205/138	205/222; 205/227; 428/679; 428/932; 428/934

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                  alerts (SDIs) affected
 NEWS 10  DEC 17  COMPUAB reloaded; updating to resume; current-awareness
                  alerts (SDIs) affected
 NEWS 11  DEC 17  SOLIDSTATE reloaded; updating to resume; current-awareness
                  alerts (SDIs) affected
 NEWS 12  DEC 17  CERAB reloaded; updating to resume; current-awareness
                  alerts (SDIs) affected
 NEWS 13  DEC 17  THREE NEW FIELDS ADDED TO IFIPAT/IFIUDB/IFICDB
 NEWS 14  DEC 30  EPFULL: New patent full text database to be available on STN
 NEWS 15  DEC 30  CAPLUS - PATENT COVERAGE EXPANDED
 NEWS 16  JAN 03  No connect-hour charges in EPFULL during January and
                  February 2005
 NEWS 17  FEB 25  CA/CAPLUS - Russian Agency for Patents and Trademarks
                  (ROSPATENT) added to list of core patent offices covered
 NEWS 18  FEB 10  STN Patent Forums to be held in March 2005
 NEWS 19  FEB 16  STN User Update to be held in conjunction with the 229th ACS
                  National Meeting on March 13, 2005
 NEWS 20  FEB 28  PATDPAFULL - New display fields provide for legal status
                  data from INPADOC
 NEWS 21  FEB 28  BABS - Current-awareness alerts (SDIs) available
 NEWS 22  FEB 28  MEDLINE/LMEDLINE reloaded
 NEWS 23  MAR 02  GBFULL: New full-text patent database on STN
 NEWS 24  MAR 03  REGISTRY/ZREGISTRY - Sequence annotations enhanced
 NEWS 25  MAR 03  MEDLINE file segment of TOXCENTER reloaded

 NEWS EXPRESS  JANUARY 10 CURRENT WINDOWS VERSION IS V7.01a, CURRENT
               MACINTOSH VERSION IS V6.0c(ENG) AND V6.0Jc(JP),
               AND CURRENT DISCOVER FILE IS DATED 10 JANUARY 2005

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DICTIONARY FILE UPDATES:    9 MAR 2005  HIGHEST RN 844817-50-1

TSCA INFORMATION NOW CURRENT THROUGH JANUARY 18, 2005

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Experimental and calculated property data are now available. For more
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to the file summary sheet on the web at:
http://www.cas.org/ONLINE/DBSS/registryss.html

=> s (co 50-65)/mac
        117053 CO/MAC
        168385 50-65/MAC
L1       12143 (CO 50-65)/MAC
                 (CO/MAC (P) 50-65/MAC)

=> s l1 and (cr 28-32)/mac
        294769 CR/MAC
         89637 28-32/MAC
         12497 (CR 28-32)/MAC
                 (CR/MAC (P) 28-32/MAC)
L2        1658 L1 AND (CR 28-32)/MAC

=> s l2 and (w 5-7)/mac
         61271 W/MAC
        183121 5-7/MAC
          8681 (W 5-7)/MAC
                 (W/MAC (P) 5-7/MAC)
L3         331 L2 AND (W 5-7)/MAC

=> s l3 and (si 0.1-2)/mac
        353535 SI/MAC
        579482 0.1-2/MAC
        272457 (SI 0.1-2)/MAC
                 (SI/MAC (P) 0.1-2/MAC)
L4         229 L3 AND (SI 0.1-2)/MAC

=> s l4 and (c 1.0-2.0)/mac
        230386 C/MAC
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        385632 1.0-2.0/MAC
         30197 (C 1.0-2.0)/MAC
                 (C/MAC (P) 1.0-2.0/MAC)
L5          114 L4 AND (C 1.0-2.0)/MAC

=> s l5 and (ni 0.1-5)/mac
        290132 NI/MAC
        659199 0.1-5/MAC
        125353 (NI 0.1-5)/MAC
                 (NI/MAC (P) 0.1-5/MAC)
L6           70 L5 AND (NI 0.1-5)/MAC

=> s l6 and (fe 0-1)/mac
        477283 FE/MAC
        520091 0-1/MAC
         47830 (FE 0-1)/MAC
                 (FE/MAC (P) 0-1/MAC)
L7           49 L6 AND (FE 0-1)/MAC

=> s l7 and (mn 0-1)/mac
        330536 MN/MAC
        520091 0-1/MAC
        210780 (MN 0-1)/MAC
                 (MN/MAC (P) 0-1/MAC)
L8           35 L7 AND (MN 0-1)/MAC

=> s l8 and (mo 0-1)/mac
        175023 MO/MAC
        520091 0-1/MAC
         86756 (MO 0-1)/MAC
                 (MO/MAC (P) 0-1/MAC)
L9           20 L8 AND (MO 0-1)/MAC

=> d l9 1-20 all

L9   ANSWER 1 OF 20  REGISTRY  COPYRIGHT 2005 ACS on STN
RN   676123-37-8  REGISTRY
ED   Entered STN:  19 Apr 2004
CN   Cobalt alloy, base, Co 45-61,Cr 28-32,W 6-8,Ni 3-6,Mo 1-3,Si 0.1-2,C
     1.2-1.7,Fe 0-1,Mn 0-1 (9CI)  (CA INDEX NAME)
MF   C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI   AYS
SR   CA
LC   STN Files:   CA, CAPLUS, USPATFULL
DT.CA  CAplus document type:  Patent
RL.P   Roles from patents:  USES (Uses)

Component   Component      Component
             Percent    Registry Number
=========+============+===============
    Co      45    -  61         7440-48-4
    Cr      28    -  32         7440-47-3
    W        6    -   8         7440-33-7
    Ni       3    -   6         7440-02-0
    Mo       1    -   3         7439-98-7
    Si       0.1 -   2         7440-21-3
    C        1.2 -   1.7       7440-44-0
    Fe       0    -   1         7439-89-6
    Mn       0    -   1         7439-96-5

               1 REFERENCES IN FILE CA (1907 TO DATE)
               1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE  1
```

```
AN   140:290742  CA
TI   Cobalt alloy for coating of components subject to erosion by liquids
IN   Giannozzi, Massimo
PA   Nuovo Pignone Holding S.P.A., Italy
SO   Eur. Pat. Appl., 12 pp.
     CODEN: EPXXDW
DT   Patent
LA   English
IC   ICM  C23C024-10
     ICS  C22C019-07; B23K035-30
CC   56-3 (Nonferrous Metals and Alloys)
FAN.CNT 1
     PATENT NO.       KIND  DATE           APPLICATION NO.  DATE
     ---------------  ----  --------       ---------------  --------
PI   EP 1403397        A1   20040331       EP 2003-256034   20030925
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
             IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK
     US 2004106000     A1   20040603       US 2003-670121   20030925
     JP 2004169176     A2   20040617       JP 2003-333738   20030925
PRAI IT 2002-MI2056    20020927
AB   The cobalt alloy comprises Cr 28-32, W 6-8, Si 0.1-2, C 1.2-1.7, Ni 3-6,
     and Mo 1-3% and may also comprise Fe and Mn ≤1% each.  The typical
     Co alloys contains Cr 30, W 7, Si 1, C 1.5, Ni 4.5, Fe <0.3, Mn <0.3, and
     Mo 1.8.  The alloy is especially suitable for laser cladding to provide
     protective coatings for the vapor turbine blades.
ST   cobalt alloy laser cladding coating turbine blade
IT   Turbines
        (blades; cobalt alloy for coating of turbine blades)
IT   Coating materials
     Laser cladding
        (cobalt alloy for coating of turbine blades)
IT   Corrosion
     Erosion (wear)
        (erosion-corrosion; cobalt alloy for coating of turbine blades)
IT   676123-33-4   676123-34-5   676123-35-6   676123-36-7   676123-37-8
     RL: TEM (Technical or engineered material use); USES (Uses)
        (cobalt alloy for coating of turbine blades)
RE.CNT  5      THERE ARE 5 CITED REFERENCES AVAILABLE FOR THIS RECORD
(1) Crook, P; US 4415532 A 1983 CAPLUS
(2) Fuji, V; EP 0759500 A 1997 CAPLUS
(3) Giorni, E; Proc Conf EUROMAT 99 1999, V11, P76
(4) Livsey, N; US 4269868 A 1981 CAPLUS
(5) Mori, K; US 5084113 A 1992 CAPLUS

L9   ANSWER 2 OF 20  REGISTRY  COPYRIGHT 2005 ACS on STN
RN   675607-64-4  REGISTRY
ED   Entered STN:  15 Apr 2004
CN   Cobalt alloy, base, Co 59,Cr 30,W 6,Ni 1.8,C 1.5,Si 1,Fe 0.5,Mn 0.3,Mo 0.3
     (9CI)  (CA INDEX NAME)
MF   C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI   AYS
SR   CA
LC   STN Files:   CA, CAPLUS, USPATFULL
DT.CA  CAplus document type:  Patent
RL.P   Roles from patents:  USES (Uses)
```

Component	Component Percent	Component Registry Number
Co	59	7440-48-4
Cr	30	7440-47-3
W	6	7440-33-7
Ni	1.8	7440-02-0

C	1.5	7440-44-0
Si	1	7440-21-3
Fe	0.5	7439-89-6
Mn	0.3	7439-96-5
Mo	0.3	7439-98-7

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 140:290741 CA
TI Cobalt alloy for erosion-resistant coating on alloy parts of vapor-type turbines
IN Giannozzi, Massimo
PA Nuovo Pignone Holding S.p.A., Italy
SO Eur. Pat. Appl., 9 pp.
CODEN: EPXXDW
DT Patent
LA English
IC ICM C23C024-10
ICS C22C019-07; F01D005-28
CC 56-3 (Nonferrous Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1403398	A2	20040331	EP 2003-256035	20030925
	EP 1403398	A3	20040414		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
	JP 2004270023	A2	20040930	JP 2003-333737	20030925
	US 2004091639	A1	20040513	US 2003-697973	20031031

PRAI IT 2002-MI2057 20020927
AB The erosion resistance to droplet impact on vapor-turbine parts is increased by coating the parts with Co alloy containing Cr 28-32, W 5-7, Si 0.1-2, C 1.2-1.7, Ni 0.5-3, Fe 0.01-1, Mn 0.01-1, and Mo 0.2-1, and impurities ≤0.5% by weight The Co-alloy coating is suitable for blades in vapor-type turbines, and can be applied by powder spray for laser-beam cladding with the nominal thickness of 0.8-3.2 mm. The typical Co alloy contains Cr 28, W 5.1, Si 0.1, C 1.2, Ni 0.5, Fe 0.01, Mn 0.01, and Mo 0.2% by weight
ST cobalt chromium tungsten alloy coating turbine erosion resistance; vapor turbine droplet resistance cobalt chromium alloy coating
IT Turbines
(blades, impact-resistant, Co-alloy coating on; Co-Cr-W alloy coating resistant to droplet impact erosion on vapor-turbine parts)
IT Cladding
(laser-beam, with Co-alloy powder feed; Co-Cr-W alloy coating resistant to droplet impact erosion on vapor-turbine parts)
IT Turbines
(vapor, Co-alloy coating for; Co-Cr-W alloy coating resistant to droplet impact erosion on vapor-turbine parts)
IT 675607-61-1
RL: TEM (Technical or engineered material use); USES (Uses)
(alloying of; Co-Cr-W alloy coating resistant to droplet impact erosion on vapor-turbine parts)
IT 675607-62-2 675607-63-3 675607-64-4
RL: TEM (Technical or engineered material use); USES (Uses)
(coating from; Co-Cr-W alloy coating resistant to droplet impact erosion on vapor-turbine parts)

L9 ANSWER 3 OF 20 REGISTRY COPYRIGHT 2005 ACS on STN
RN 675607-63-3 REGISTRY
ED Entered STN: 15 Apr 2004

CN Cobalt alloy, base, Co 53,Cr 32,W 6.5,Ni 2.8,Si 1.8,C 1.6,Fe 0.9,Mo 0.9,Mn 0.8 (9CI) (CA INDEX NAME)
MF C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI AYS
SR CA
LC STN Files: CA, CAPLUS, USPATFULL
DT.CA CAplus document type: Patent
RL.P Roles from patents: USES (Uses)

Component	Component Percent	Component Registry Number
Co	53	7440-48-4
Cr	32	7440-47-3
W	6.5	7440-33-7
Ni	2.8	7440-02-0
Si	1.8	7440-21-3
C	1.6	7440-44-0
Fe	0.9	7439-89-6
Mo	0.9	7439-98-7
Mn	0.8	7439-96-5

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 140:290741 CA
TI Cobalt alloy for erosion-resistant coating on alloy parts of vapor-type turbines
IN Giannozzi, Massimo
PA Nuovo Pignone Holding S.p.A., Italy
SO Eur. Pat. Appl., 9 pp.
CODEN: EPXXDW
DT Patent
LA English
IC ICM C23C024-10
ICS C22C019-07; F01D005-28
CC 56-3 (Nonferrous Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1403398	A2	20040331	EP 2003-256035	20030925
	EP 1403398	A3	20040414		
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK				
	JP 2004270023	A2	20040930	JP 2003-333737	20030925
	US 2004091639	A1	20040513	US 2003-697973	20031031

PRAI IT 2002-MI2057 20020927
AB The erosion resistance to droplet impact on vapor-turbine parts is increased by coating the parts with Co alloy containing Cr 28-32, W 5-7, Si 0.1-2, C 1.2-1.7, Ni 0.5-3, Fe 0.01-1, Mn 0.01-1, and Mo 0.2-1, and impurities ≤0.5% by weight The Co-alloy coating is suitable for blades in vapor-type turbines, and can be applied by powder spray for laser-beam cladding with the nominal thickness of 0.8-3.2 mm. The typical Co alloy contains Cr 28, W 5.1, Si 0.1, C 1.2, Ni 0.5, Fe 0.01, Mn 0.01, and Mo 0.2% by weight
ST cobalt chromium tungsten alloy coating turbine erosion resistance; vapor turbine droplet resistance cobalt chromium alloy coating
IT Turbines
(blades, impact-resistant, Co-alloy coating on; Co-Cr-W alloy coating resistant to droplet impact erosion on vapor-turbine parts)
IT Cladding
(laser-beam, with Co-alloy powder feed; Co-Cr-W alloy coating resistant

```
      to droplet impact erosion on vapor-turbine parts)
IT   Turbines
        (vapor, Co-alloy coating for; Co-Cr-W alloy coating resistant to
        droplet impact erosion on vapor-turbine parts)
IT   675607-61-1
     RL: TEM (Technical or engineered material use); USES (Uses)
        (alloying of; Co-Cr-W alloy coating resistant to droplet impact erosion
        on vapor-turbine parts)
IT   675607-62-2   675607-63-3   675607-64-4
     RL: TEM (Technical or engineered material use); USES (Uses)
        (coating from; Co-Cr-W alloy coating resistant to droplet impact
        erosion on vapor-turbine parts)

L9   ANSWER 4 OF 20  REGISTRY  COPYRIGHT 2005 ACS on STN
RN   675607-61-1  REGISTRY
ED   Entered STN:  15 Apr 2004
CN   Cobalt alloy, base, Co 51-65,Cr 28-32,W 5-7,Ni 0.5-3,Si 0.1-2,C 1.2-1.7,Mo
     0.2-1,Fe 0-1,Mn 0-1 (9CI)  (CA INDEX NAME)
MF   C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI   AYS
SR   CA
LC   STN Files:   CA, CAPLUS, USPATFULL
DT.CA  CAplus document type:  Patent
RL.P   Roles from patents:  USES (Uses)

Component   Component      Component
             Percent    Registry Number
=========+=============+===============
    Co      51    -  65       7440-48-4
    Cr      28    -  32       7440-47-3
    W        5    -   7       7440-33-7
    Ni       0.5 -   3        7440-02-0
    Si       0.1 -   2        7440-21-3
    C        1.2 -   1.7      7440-44-0
    Mo       0.2 -   1        7439-98-7
    Fe       0    -   1       7439-89-6
    Mn       0    -   1       7439-96-5

               1 REFERENCES IN FILE CA (1907 TO DATE)
               1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE  1

AN   140:290741  CA
TI   Cobalt alloy for erosion-resistant coating on alloy parts of vapor-type
     turbines
IN   Giannozzi, Massimo
PA   Nuovo Pignone Holding S.p.A., Italy
SO   Eur. Pat. Appl., 9 pp.
     CODEN: EPXXDW
DT   Patent
LA   English
IC   ICM  C23C024-10
     ICS  C22C019-07; F01D005-28
CC   56-3 (Nonferrous Metals and Alloys)
FAN.CNT 1
     PATENT NO.        KIND  DATE           APPLICATION NO.  DATE
     ---------------   ----  --------       ---------------  --------
PI   EP 1403398         A2   20040331       EP 2003-256035   20030925
     EP 1403398         A3   20040414
         R:  AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT,
             IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, SK
     JP 2004270023      A2   20040930       JP 2003-333737   20030925
     US 2004091639      A1   20040513       US 2003-697973   20031031
```

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PRAI IT 2002-MI2057   20020927
AB   The erosion resistance to droplet impact on vapor-turbine parts is
     increased by coating the parts with Co alloy containing Cr 28-32, W 5-7, Si
     0.1-2, C 1.2-1.7, Ni 0.5-3, Fe 0.01-1, Mn 0.01-1, and Mo 0.2-1, and
     impurities ≤0.5% by weight  The Co-alloy coating is suitable for
     blades in vapor-type turbines, and can be applied by powder spray for
     laser-beam cladding with the nominal thickness of 0.8-3.2 mm.  The typical
     Co alloy contains Cr 28, W 5.1, Si 0.1, C 1.2, Ni 0.5, Fe 0.01, Mn 0.01,
     and Mo 0.2% by weight
ST   cobalt chromium tungsten alloy coating turbine erosion resistance; vapor
     turbine droplet resistance cobalt chromium alloy coating
IT   Turbines
        (blades, impact-resistant, Co-alloy coating on; Co-Cr-W alloy coating
        resistant to droplet impact erosion on vapor-turbine parts)
IT   Cladding
        (laser-beam, with Co-alloy powder feed; Co-Cr-W alloy coating resistant
        to droplet impact erosion on vapor-turbine parts)
IT   Turbines
        (vapor, Co-alloy coating for; Co-Cr-W alloy coating resistant to
        droplet impact erosion on vapor-turbine parts)
IT   675607-61-1
     RL: TEM (Technical or engineered material use); USES (Uses)
        (alloying of; Co-Cr-W alloy coating resistant to droplet impact erosion
        on vapor-turbine parts)
IT   675607-62-2   675607-63-3   675607-64-4
     RL: TEM (Technical or engineered material use); USES (Uses)
        (coating from; Co-Cr-W alloy coating resistant to droplet impact
        erosion on vapor-turbine parts)

L9   ANSWER 5 OF 20  REGISTRY  COPYRIGHT 2005 ACS on STN
RN   488092-37-1  REGISTRY
ED   Entered STN:  10 Feb 2003
CN   Cobalt alloy, base, Co 0-95,Cr 5-30,Ni 0-25,Mo 0-15,W 0-15,C 0-5,Fe 0-5,Mn
     0-5,Si 0-5 (9CI)  (CA INDEX NAME)
MF   C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI   AYS
SR   CA
LC   STN Files:   CA, CAPLUS, USPATFULL
DT.CA  CAplus document type:  Patent
RL.P   Roles from patents:  PREP (Preparation); PRP (Properties); USES (Uses)
```

Component	Component Percent	Component Registry Number
Co	0 - 95	7440-48-4
Cr	5 - 30	7440-47-3
Ni	0 - 25	7440-02-0
Mo	0 - 15	7439-98-7
W	0 - 15	7440-33-7
C	0 - 5	7440-44-0
Fe	0 - 5	7439-89-6
Mn	0 - 5	7439-96-5
Si	0 - 5	7440-21-3

```
               1 REFERENCES IN FILE CA (1907 TO DATE)
               1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE  1

AN   138:110563  CA
TI   Sintered tin-containing cobalt and nickel alloys with improved bearing
     sliding characteristics
IN   Whitaker, Lain Robert; Pavey, Richard Jameson
PA   Federal-Mogul Sintered Products Ltd., UK
```

SO PCT Int. Appl., 22 pp.
CODEN: PIXXD2
DT Patent
LA English
IC ICM C22C001-04
CC 56-3 (Nonferrous Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	WO 2003004711	A1	20030116	WO 2002-GB2911	20020625
	W: AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, MZ, NO, NZ, OM, PH, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZM, ZW, AM, AZ, BY, KG, KZ, MD, RU, TJ, TM				
	RW: GH, GM, KE, LS, MW, MZ, SD, SL, SZ, TZ, UG, ZM, ZW, AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE, TR, BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG				
	GB 2392168	A1	20040225	GB 2003-29418	20020625
	GB 2392168	B2	20041222		
	EP 1412547	A1	20040428	EP 2002-782469	20020625
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR				
	JP 2004533543	T2	20041104	JP 2003-510468	20020625
	US 2004237712	A1	20041202	US 2004-482253	20040524

PRAI GB 2001-16203 20010703
WO 2002-GB2911 20020625

AB The material comprises an alloy selected from one of the groups having a composition comprising in weight %: either Cr 5-30, Mo 0-15, Ni 0-25, W 0-15, C 0-5, Si 0-5, Fe 0-5, Mn 0-5%, Co balance, or Cr 10-20, Mo 0-15, Co 0-20, W 0-5, Fe 0-20, Al 0-5, Ti 0-5%, Ni balance; the said alloy having incorporated Sn 3-15% and optionally 1-6% of a solid lubricant material. Molybdenum disulfide or tungsten disulfide may be used as the solid lubricants. The alloys have decreased shrinkage and are suitable for turbochargers of internal combustion engines; their use increases the power output and decreases the emission.

ST tin cobalt solid lubricant alloy shrinkage bearing; nickel tin solid lubricant alloy shrinkage bearing

IT Bearings
Contraction (mechanical)
Hardness (mechanical)
(sintered tin-containing cobalt and nickel alloys with improved bearing sliding characteristics)

IT Density
(sintered; sintered tin-containing cobalt and nickel alloys with improved bearing sliding characteristics)

IT Internal combustion engines
(turbochargers; sintered tin-containing cobalt and nickel alloys with improved bearing sliding characteristics)

IT 1317-33-5, Molybdenum disulfide, uses
RL: MOA (Modifier or additive use); USES (Uses)
(alloy additive; sintered tin-containing cobalt and nickel alloys with improved bearing sliding characteristics)

IT 12638-07-2P, Stellite 31 51141-95-8P, Tribaloy T400 488092-37-1P, Carbon 0-5, chromium 5-30, cobalt-5-95, iron 0-5, manganese 0-5, molybdenum 0-15, nickel 0-25, silicon 0-5, tungsten 0-15 488092-38-2P, Aluminum 0-5, chromium 10-20, cobalt 0-20, iron 0-20, molybdenum 0-15, nickel 10-90, titanium 0-5, tungsten 0-5
RL: IMF (Industrial manufacture); PRP (Properties); TEM (Technical or engineered material use); PREP (Preparation); USES (Uses)
(alloy base; sintered tin-containing cobalt and nickel alloys with improved bearing sliding characteristics)

IT 7440-31-5, Tin, uses 12138-09-9, Tungsten disulfide
RL: MOA (Modifier or additive use); USES (Uses)
(solid lubricant, alloy additive; sintered tin-containing cobalt and nickel alloys with improved bearing sliding characteristics)
RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD
(1) Clough, G; US 3461069 A 1969
(2) Davis, J; Nickel, cobalt and their alloys 2000, P58
(3) Lesgourgues, J; US 4272290 A 1981 CAPLUS

L9 ANSWER 6 OF 20 REGISTRY COPYRIGHT 2005 ACS on STN
RN 314777-59-8 REGISTRY
ED Entered STN: 18 Jan 2001
CN Cobalt alloy, base, Co 51-70,Cr 26-32,W 3-6,Fe 0-3,Ni 0-3,Si 0.4-2,C 0.9-1.4,Mn 0-1,Mo 0-1 (9CI) (CA INDEX NAME)
MF C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI AYS
SR CA
LC STN Files: CA, CAPLUS
DT.CA CAplus document type: Patent
RL.P Roles from patents: PROC (Process)

Component	Component Percent	Component Registry Number
Co	51 - 70	7440-48-4
Cr	26 - 32	7440-47-3
W	3 - 6	7440-33-7
Fe	0 - 3	7439-89-6
Ni	0 - 3	7440-02-0
Si	0.4 - 2	7440-21-3
C	0.9 - 1.4	7440-44-0
Mn	0 - 1	7439-96-5
Mo	0 - 1	7439-98-7

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 134:74888 CA
TI Heat treatment of cobalt alloy for prevention of cracking in welding to carbon steel
IN Okano, Masatoshi; Honda, Hitoshi
PA Okano Valve Seizo K. K., Japan
SO Jpn. Kokai Tokkyo Koho, 6 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM C22F001-10
ICS C22C019-07; C22F001-00
CC 56-9 (Nonferrous Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2001003149	A2	20010109	JP 1999-172685	19990618
	JP 3263378	B2	20020304		

PRAI JP 1999-172685 19990618
AB A Co alloy containing C 0.9-1.4, Mn ≤1.0, SI 0.4-2.0, Cr 26.0-32.0, W 3.0-6.0, Mo ≤1.0, Ni ≤3.0, and Fe ≤3.0% is welded to carbon steel and when the Fe content becomes ≥5.0%, it is heated to ≥700°. The heat treatment suppresses the decrease in grain boundary cracking resistance of the Co alloy in arc welding such as PTA welding or TIG welding.
ST cobalt alloy welding carbon steel cracking prevention heat treatment

IT Crack (fracture)
Heat treatment
Welding of metals
(heat treatment of cobalt alloy for prevention of cracking in welding to carbon steel)

IT 11121-90-7, Carbon steel, processes 314777-46-3 314777-47-4 314777-48-5 314777-49-6 314777-50-9 314777-51-0 314777-52-1 314777-53-2 314777-54-3 314777-55-4 314777-56-5 314777-57-6 314777-58-7 314777-59-8
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(heat treatment of cobalt alloy for prevention of cracking in welding to carbon steel)

L9 ANSWER 7 OF 20 REGISTRY COPYRIGHT 2005 ACS on STN
RN 251447-93-5 REGISTRY
ED Entered STN: 21 Dec 1999
CN Cobalt alloy, base, Co 51-70,Cr 26-32,W 3-6,Fe 0-3,Ni 0-3,Si 0-2,C 0.9-1.4,Mn 0-1,Mo 0-1 (9CI) (CA INDEX NAME)
MF C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI AYS
SR CA
LC STN Files: CA, CAPLUS
DT.CA CAplus document type: Patent
RL.P Roles from patents: PRP (Properties); USES (Uses)

Component	Component Percent	Component Registry Number
Co	51 - 70	7440-48-4
Cr	26 - 32	7440-47-3
W	3 - 6	7440-33-7
Fe	0 - 3	7439-89-6
Ni	0 - 3	7440-02-0
Si	0 - 2	7440-21-3
C	0.9 - 1.4	7440-44-0
Mn	0 - 1	7439-96-5
Mo	0 - 1	7439-98-7

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 132:14685 CA
TI Steam turbine blade with bucket cover and steam turbine using the blade
IN Kondo, Yoshiyuki; Oyama, Koji
PA Mitsubishi Heavy Industries, Ltd., Japan
SO Jpn. Kokai Tokkyo Koho, 4 pp.
CODEN: JKXXAF
DT Patent
LA Japanese
IC ICM F01D005-28
ICS C22C019-07; F01D005-22
CC 56-6 (Nonferrous Metals and Alloys)
Section cross-reference(s): 55
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 11336502	A2	19991207	JP 1998-145939	19980527

PRAI JP 1998-145939 19980527
AB In the title blade having a bucket cover at the tip, the planes in contact with adjacent bucket covers are coated with a Co alloy containing Cr 26-32, W 3-6, Fe <3, Mo <1, Ni <3, C 0.9-1.4, Si <2, and Mn <1 weight%, and the coatings are formed by welding. The steam turbine having the blades is

also claimed. The cover has high wear resistance, and the turbine can be operated with high safety and has long life.

ST steam turbine blade bucket cover; cobalt alloy welding cover turbine blade; wear resistant coating cover turbine blade

IT Coating materials
(abrasion-resistant; steam turbine blade having bucket cover coated with wear-resistant Co alloy for long life)

IT Turbines
(steam, blades; steam turbine blade having bucket cover coated with wear-resistant Co alloy for long life)

IT 12611-80-2, SUS 630
RL: DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(steam turbine blade having bucket cover coated with wear-resistant Co alloy for long life)

IT 11105-35-4, Stellite 6 251447-93-5
RL: DEV (Device component use); PRP (Properties); USES (Uses)
(steam turbine blade having bucket cover coated with wear-resistant Co alloy for long life)

L9 ANSWER 8 OF 20 REGISTRY
RN 152324-06-6 REGISTRY
ED Entered STN: 18 Jan 1994
CN Cobalt alloy, base, Co 48-71,Cr 25.0-32.0,W 3.00-6.00,Fe 0-5.00,Ni 0-3.00,Mn 0-2.00,Si 0-2.00,C 0.70-1.40,Mo 0-1.00 (UNS W73006) (9CI) (CA INDEX NAME)
OTHER NAMES:
CN ASME SFA5.13-ECoCr-A
CN AWS A5.13-ECoCr-A
CN AWS ECoCr-A
CN ECoCr-A
CN Stellite 6 electrode
CN UNS W73006
CN W73006
MF C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI AYS
SR CA
LC STN Files: CA, CAPLUS
DT.CA CAplus document type: Conference
RL.NP Roles from non-patents: USES (Uses)

Component	Component Percent	Component Registry Number
Co	48 - 71	7440-48-4
Cr	25.0 - 32.0	7440-47-3
W	3.00 - 6.00	7440-33-7
Fe	0 - 5.00	7439-89-6
Ni	0 - 3.00	7440-02-0
Mn	0 - 2.00	7439-96-5
Si	0 - 2.00	7440-21-3
C	0.70 - 1.40	7440-44-0
Mo	0 - 1.00	7439-98-7

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 120:59512 CA
TI Study of dilution of high alloy overlays
AU Chattopadhyay, R.; Kammer, P. A.
CS Ewac Alloys Ltd., Bombay, India
SO Int. Trends Weld. Sci. Technol., Proc. Int. Conf. Trends Weld. Res., 3rd

(1993), Meeting Date 1992, 455-60. Editor(s): David, Stan A.; Vitek, J.
M. Publisher: ASM, Materials Park, Ohio.
CODEN: 59GAAM
DT Conference
LA English
CC 55-9 (Ferrous Metals and Alloys)
AB The high alloy overlays of ECoCrA and ENiCrMo-4 were diluted by iron from the mild steel substrate to different extents, depending on the welding process and parameters. The dilution of major alloy constituents can be >30% in manual metal-arc welding. The dilution in plasma transfered-arc welding using powder alloys can be controlled within 5-10%. The effect of dilution in the overlays using both processes on the microstructure, hardness, wear, and corrosion properties were studied.
ST steel diln overlay welding
IT Welding
(metal-arc and plasma transfered-arc, overlay, on steel, dilution during)
IT 140409-79-6, ENiCrMo4 152324-06-6, ECoCrA
RL: USES (Uses)
(welding with overlays of, on steel, dilution during)
IT 12597-69-2
RL: USES (Uses)
(welding, metal-arc and plasma transfered-arc, overlay, on steel, dilution during)

L9 ANSWER 9 OF 20 REGISTRY
RN 144321-08-4 REGISTRY
ED Entered STN: 06 Nov 1992
CN Cobalt alloy, base, Co 45-67,Cr 25.0-32.0,W 7.00-9.50,Fe 0-5.00,Ni 0-3.00,Mn 0-2.00,Si 0-2.00,C 1.00-1.70,Mo 0-1.00 (UNS W73012) (9CI) (CA INDEX NAME)
OTHER NAMES:
CN AWS ECoCr-B
CN ECoCr-B
CN Stellite 12 electrode
CN UNS W73012
MF C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI AYS
SR CA
LC STN Files: CA, CAPLUS
DT.CA CAplus document type: Journal
RL.NP Roles from non-patents: USES (Uses)

Component	Component Percent	Component Registry Number
Co	45 - 67	7440-48-4
Cr	25.0 - 32.0	7440-47-3
W	7.00 - 9.50	7440-33-7
Fe	0 - 5.00	7439-89-6
Ni	0 - 3.00	7440-02-0
Mn	0 - 2.00	7439-96-5
Si	0 - 2.00	7440-21-3
C	1.00 - 1.70	7440-44-0
Mo	0 - 1.00	7439-98-7

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 117:217001 CA
TI Effect of welding variables on cracking in cobalt-based SMA hardfacing deposits
AU Sharples, R. V.; Gooch, T. G.

CS Weld. Inst., Abington Hall, Cambridge, UK
SO Welding Research (Miami, FL, United States) (1992), (May), 195-200
Published in: Weld. J. (Miami), 71(5)
CODEN: WERSA3; ISSN: 0096-7629
DT Journal
LA English
CC 55-9 (Ferrous Metals and Alloys)
AB Cracking in Co alloy shielded metal arc (SMA) deposits decreased with increasing current and preheat temperature for single- and two-layer deposits. Limiting conditions for deposit cracking were defined in terms of deposit dilution and cooling rate.
ST cobalt alloy hardfacing deposit cracking; welding variable hardfacing cracking; carbon steel surfacing cobalt alloy
IT Welds
(surfacings, of cobalt alloy on carbon steel, cracking of, welding parameter effect on)
IT Welding
(surfacing, of carbon steel with cobalt alloy, cracking in)
IT 39303-63-4, 080A42, miscellaneous
RL: MSC (Miscellaneous)
(cobalt alloy hardfacings on, cracking of, welding variable effect on)
IT 144321-08-4, ECoCrB
RL: USES (Uses)
(hardfacings of, on carbon steel, cracking of, welding variable effect on)
IT 12597-69-2
RL: USES (Uses)
(welding, surfacing, of carbon steel with cobalt alloy, cracking in)
IT 12597-69-2
RL: USES (Uses)
(welds, surfacings, of cobalt alloy on carbon steel, cracking of, welding parameter effect on)

L9 ANSWER 10 OF 20 REGISTRY COPYRIGHT 2005 ACS on STN
RN 123929-13-5 REGISTRY
ED Entered STN: 23 Nov 1989
CN Cobalt alloy, base, Co 51-68,Cr 26-30,W 3.5-5.5,Ni 0.7-3,Fe 0-3,Al 0.1-2,C 1.2-1.6,Si 0.7-1.5,Mo 0-1,N 0.1-0.8,Mn 0-0.5 (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Aluminum alloy, nonbase, Co 51-68,Cr 26-30,W 3.5-5.5,Ni 0.7-3,Fe 0-3,Al 0.1-2,C 1.2-1.6,Si 0.7-1.5,Mo 0-1,N 0.1-0.8,Mn 0-0.5
CN Carbon alloy, nonbase, Co 51-68,Cr 26-30,W 3.5-5.5,Ni 0.7-3,Fe 0-3,Al 0.1-2,C 1.2-1.6,Si 0.7-1.5,Mo 0-1,N 0.1-0.8,Mn 0-0.5
CN Chromium alloy, nonbase, Co 51-68,Cr 26-30,W 3.5-5.5,Ni 0.7-3,Fe 0-3,Al 0.1-2,C 1.2-1.6,Si 0.7-1.5,Mo 0-1,N 0.1-0.8,Mn 0-0.5
CN Iron alloy, nonbase, Co 51-68,Cr 26-30,W 3.5-5.5,Ni 0.7-3,Fe 0-3,Al 0.1-2,C 1.2-1.6,Si 0.7-1.5,Mo 0-1,N 0.1-0.8,Mn 0-0.5
CN Molybdenum alloy, nonbase, Co 51-68,Cr 26-30,W 3.5-5.5,Ni 0.7-3,Fe 0-3,Al 0.1-2,C 1.2-1.6,Si 0.7-1.5,Mo 0-1,N 0.1-0.8,Mn 0-0.5
CN Nickel alloy, nonbase, Co 51-68,Cr 26-30,W 3.5-5.5,Ni 0.7-3,Fe 0-3,Al 0.1-2,C 1.2-1.6,Si 0.7-1.5,Mo 0-1,N 0.1-0.8,Mn 0-0.5
CN Silicon alloy, nonbase, Co 51-68,Cr 26-30,W 3.5-5.5,Ni 0.7-3,Fe 0-3,Al 0.1-2,C 1.2-1.6,Si 0.7-1.5,Mo 0-1,N 0.1-0.8,Mn 0-0.5
CN Tungsten alloy, nonbase, Co 51-68,Cr 26-30,W 3.5-5.5,Ni 0.7-3,Fe 0-3,Al 0.1-2,C 1.2-1.6,Si 0.7-1.5,Mo 0-1,N 0.1-0.8,Mn 0-0.5
MF C . Al . Co . Cr . Fe . Mn . Mo . N . Ni . Si . W
CI AYS
SR CA
LC STN Files: CA, CAPLUS
DT.CA CAplus document type: Patent
RL.P Roles from patents: PROC (Process); USES (Uses)

Component	Component Percent	Component Registry Number

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========+============+==============
    Co      51   -  68       7440-48-4
    Cr      26   -  30       7440-47-3
    W        3.5 -   5.5     7440-33-7
    Ni       0.7 -   3       7440-02-0
    Fe       0   -   3       7439-89-6
    Al       0.1 -   2       7429-90-5
    C        1.2 -   1.6     7440-44-0
    Si       0.7 -   1.5     7440-21-3
    Mo       0   -   1       7439-98-7
    N        0.1 -   0.8    17778-88-0
    Mn       0   -   0.5     7439-96-5

               1 REFERENCES IN FILE CA (1907 TO DATE)
               1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE  1

AN    111:238038  CA
TI    Alloys for hardfacing of machinery parts
IN    Weintz, Richard; Mueller, Reinhard
PA    TRW Thompson G.m.b.H., Fed. Rep. Ger.
SO    Ger. Offen., 6 pp.
      CODEN: GWXXBX
DT    Patent
LA    German
IC    ICM  C22C038-58
      ICS  F01L003-04; B23K035-32; B23K028-00
CC    56-3 (Nonferrous Metals and Alloys)
FAN.CNT 1
      PATENT NO.        KIND  DATE            APPLICATION NO.  DATE
      ---------------   ----  --------        ---------------  --------
PI    DE 3905397         A1   19890928        DE 1989-3905397  19890222
      DE 3905397         C2   19951012
      EP 338204          A2   19891025        EP 1989-102814   19890218
      EP 338204          A3   19920701
      EP 338204          B1   19940817
          R:  DE, ES, FR, GB, IT, NL, SE
      ES 2059589         T3   19941116        ES 1989-102814   19890218
PRAI DE 1988-3805835  19880225
AB    Machinery parts, e.g., engine valves, are hardfaced to form a dense layer
      with the alloy containing C 0.80-1.50, Si ≤0.40, Cr 25.0-30.0, Mn
      7.0-15.0, Ni 7.0-15.0, Mo 3.0-8.0, Nb 2.0-4.0, Al 0.2-1.0, N 0.105-0.80%,
      and Fe the balance.  Alternative hardfacing alloy compns. are: (1) C
      2.40-2.80, Si ≤1.5, Cr 28.0-32.0, Mn ≤1.0, Ni ≤3.0,
      Mo ≤1.0, W 11.5-14.0, Fe ≤3.0, N 0.105-0.8%, and Co the
      balance; (2) C 1.0-1.3, Si 0.9-1.3, Cr 27.0-30.0, Mn 7.0-10.0, Ni
      15.0-25.0, Mo ≤0.6, W 10.0-12.0, Fe ≤1.35, and N 0.105-0.8%,
      and Co the balance; and (3) C 1.70-2.20, Si 0.9-1.3, Cr 25.0-28.0, Co
      10.0-12.0, W 11.5-13.0, Fe ≤1.35, N 0.105-0.8%, and Ni the balance.
ST    hard facing alloy porosity; iron hard facing alloy porosity; cobalt hard
      facing alloy porosity; nickel hard facing alloy porosity; engine valve
      hard facing alloy
IT    Welding
         (hard-facing, of machinery part, with cobalt alloy or iron alloy or
         nickel alloy)
IT    Engines
         (valves, hardfacing of, with cobalt alloy or iron alloy or nickel
         alloy)
IT    123929-07-7   123929-08-8   123929-09-9   123929-10-2   123929-11-3
      123929-12-4   123929-13-5   123929-14-6   123929-15-7   123929-16-8
      123929-17-9   123929-18-0   123929-19-1   123929-20-4   123929-21-5
      123929-22-6   123929-23-7   123929-24-8   123929-25-9   123929-26-0
      123929-27-1   123929-28-2   123929-29-3   123929-30-6   123929-31-7
```

123929-32-8   123929-33-9   123929-34-0   123929-35-1
RL: PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(hardfacing with, of machinery parts)

L9 ANSWER 11 OF 20 REGISTRY COPYRIGHT 2005 ACS on STN
RN 123929-12-4 REGISTRY
ED Entered STN: 23 Nov 1989
CN Cobalt alloy, base, Co 53-68,Cr 26-30,W 3.5-5.5,Ni 0.7-3,Fe 0-3,C 1.2-1.6,Si 0.7-1.5,Mo 0-1,N 0.1-0.8,Mn 0-0.5 (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Carbon alloy, nonbase, Co 53-68,Cr 26-30,W 3.5-5.5,Ni 0.7-3,Fe 0-3,C 1.2-1.6,Si 0.7-1.5,Mo 0-1,N 0.1-0.8,Mn 0-0.5
CN Chromium alloy, nonbase, Co 53-68,Cr 26-30,W 3.5-5.5,Ni 0.7-3,Fe 0-3,C 1.2-1.6,Si 0.7-1.5,Mo 0-1,N 0.1-0.8,Mn 0-0.5
CN Iron alloy, nonbase, Co 53-68,Cr 26-30,W 3.5-5.5,Ni 0.7-3,Fe 0-3,C 1.2-1.6,Si 0.7-1.5,Mo 0-1,N 0.1-0.8,Mn 0-0.5
CN Molybdenum alloy, nonbase, Co 53-68,Cr 26-30,W 3.5-5.5,Ni 0.7-3,Fe 0-3,C 1.2-1.6,Si 0.7-1.5,Mo 0-1,N 0.1-0.8,Mn 0-0.5
CN Nickel alloy, nonbase, Co 53-68,Cr 26-30,W 3.5-5.5,Ni 0.7-3,Fe 0-3,C 1.2-1.6,Si 0.7-1.5,Mo 0-1,N 0.1-0.8,Mn 0-0.5
CN Silicon alloy, nonbase, Co 53-68,Cr 26-30,W 3.5-5.5,Ni 0.7-3,Fe 0-3,C 1.2-1.6,Si 0.7-1.5,Mo 0-1,N 0.1-0.8,Mn 0-0.5
CN Tungsten alloy, nonbase, Co 53-68,Cr 26-30,W 3.5-5.5,Ni 0.7-3,Fe 0-3,C 1.2-1.6,Si 0.7-1.5,Mo 0-1,N 0.1-0.8,Mn 0-0.5
MF C . Co . Cr . Fe . Mn . Mo . N . Ni . Si . W
CI AYS
SR CA
LC STN Files: CA, CAPLUS
DT.CA CAplus document type: Patent
RL.P Roles from patents: PROC (Process); USES (Uses)

Component	Component Percent	Component Registry Number
Co	53 - 68	7440-48-4
Cr	26 - 30	7440-47-3
W	3.5 - 5.5	7440-33-7
Ni	0.7 - 3	7440-02-0
Fe	0 - 3	7439-89-6
C	1.2 - 1.6	7440-44-0
Si	0.7 - 1.5	7440-21-3
Mo	0 - 1	7439-98-7
N	0.1 - 0.8	17778-88-0
Mn	0 - 0.5	7439-96-5

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 111:238038 CA
TI Alloys for hardfacing of machinery parts
IN Weintz, Richard; Mueller, Reinhard
PA TRW Thompson G.m.b.H., Fed. Rep. Ger.
SO Ger. Offen., 6 pp.
CODEN: GWXXBX
DT Patent
LA German
IC ICM C22C038-58
ICS F01L003-04; B23K035-32; B23K028-00
CC 56-3 (Nonferrous Metals and Alloys)
FAN.CNT 1
PATENT NO. KIND DATE APPLICATION NO. DATE

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PI   DE 3905397       A1   19890928        DE 1989-3905397  19890222
     DE 3905397       C2   19951012
     EP 338204        A2   19891025        EP 1989-102814   19890218
     EP 338204        A3   19920701
     EP 338204        B1   19940817
         R: DE, ES, FR, GB, IT, NL, SE
     ES 2059589       T3   19941116        ES 1989-102814   19890218
PRAI DE 1988-3805835  19880225
AB   Machinery parts, e.g., engine valves, are hardfaced to form a dense layer
     with the alloy containing C 0.80-1.50, Si ≤0.40, Cr 25.0-30.0, Mn
     7.0-15.0, Ni 7.0-15.0, Mo 3.0-8.0, Nb 2.0-4.0, Al 0.2-1.0, N 0.105-0.80%,
     and Fe the balance.  Alternative hardfacing alloy compns. are: (1) C
     2.40-2.80, Si ≤1.5, Cr 28.0-32.0, Mn ≤1.0, Ni ≤3.0,
     Mo ≤1.0, W 11.5-14.0, Fe ≤3.0, N 0.105-0.8%, and Co the
     balance; (2) C 1.0-1.3, Si 0.9-1.3, Cr 27.0-30.0, Mn 7.0-10.0, Ni
     15.0-25.0, Mo ≤0.6, W 10.0-12.0, Fe ≤1.35, and N 0.105-0.8%,
     and Co the balance; and (3) C 1.70-2.20, Si 0.9-1.3, Cr 25.0-28.0, Co
     10.0-12.0, W 11.5-13.0, Fe ≤1.35, N 0.105-0.8%, and Ni the balance.
ST   hard facing alloy porosity; iron hard facing alloy porosity; cobalt hard
     facing alloy porosity; nickel hard facing alloy porosity; engine valve
     hard facing alloy
IT   Welding
        (hard-facing, of machinery part, with cobalt alloy or iron alloy or
        nickel alloy)
IT   Engines
        (valves, hardfacing of, with cobalt alloy or iron alloy or nickel
        alloy)
IT   123929-07-7   123929-08-8   123929-09-9   123929-10-2   123929-11-3
     123929-12-4   123929-13-5   123929-14-6   123929-15-7   123929-16-8
     123929-17-9   123929-18-0   123929-19-1   123929-20-4   123929-21-5
     123929-22-6   123929-23-7   123929-24-8   123929-25-9   123929-26-0
     123929-27-1   123929-28-2   123929-29-3   123929-30-6   123929-31-7
     123929-32-8   123929-33-9   123929-34-0   123929-35-1
     RL: PEP (Physical, engineering or chemical process); TEM (Technical or
     engineered material use); PROC (Process); USES (Uses)
        (hardfacing with, of machinery parts)

L9   ANSWER 12 OF 20  REGISTRY  COPYRIGHT 2005 ACS on STN
RN   100309-96-4  REGISTRY
ED   Entered STN:  15 Feb 1986
CN   Cobalt alloy, base, Co 48-70,Cr 26-32,W 3-6,Fe 0-5,Ni 0-3,Mn 0-2,Si 0-2,C
     0.7-1.4,Mo 0-1 (9CI)  (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN   Carbon alloy, nonbase, Co 48-70,Cr 26-32,W 3-6,Fe 0-5,Ni 0-3,Mn 0-2,Si
     0-2,C 0.7-1.4,Mo 0-1
CN   Chromium alloy, nonbase, Co 48-70,Cr 26-32,W 3-6,Fe 0-5,Ni 0-3,Mn 0-2,Si
     0-2,C 0.7-1.4,Mo 0-1
CN   Iron alloy, nonbase, Co 48-70,Cr 26-32,W 3-6,Fe 0-5,Ni 0-3,Mn 0-2,Si 0-2,C
     0.7-1.4,Mo 0-1
CN   Manganese alloy, nonbase, Co 48-70,Cr 26-32,W 3-6,Fe 0-5,Ni 0-3,Mn 0-2,Si
     0-2,C 0.7-1.4,Mo 0-1
CN   Molybdenum alloy, nonbase, Co 48-70,Cr 26-32,W 3-6,Fe 0-5,Ni 0-3,Mn 0-2,Si
     0-2,C 0.7-1.4,Mo 0-1
CN   Nickel alloy, nonbase, Co 48-70,Cr 26-32,W 3-6,Fe 0-5,Ni 0-3,Mn 0-2,Si
     0-2,C 0.7-1.4,Mo 0-1
CN   Silicon alloy, nonbase, Co 48-70,Cr 26-32,W 3-6,Fe 0-5,Ni 0-3,Mn 0-2,Si
     0-2,C 0.7-1.4,Mo 0-1
CN   Tungsten alloy, nonbase, Co 48-70,Cr 26-32,W 3-6,Fe 0-5,Ni 0-3,Mn 0-2,Si
     0-2,C 0.7-1.4,Mo 0-1
MF   C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI   AYS
SR   CA
LC   STN Files:   CA, CAPLUS, USPATFULL
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DT.CA CAplus document type: Patent
RL.P Roles from patents: PREP (Preparation); PROC (Process)

Component	Component Percent	Component Registry Number
Co	48 - 70	7440-48-4
Cr	26 - 32	7440-47-3
W	3 - 6	7440-33-7
Fe	0 - 5	7439-89-6
Ni	0 - 3	7440-02-0
Mn	0 - 2	7439-96-5
Si	0 - 2	7440-21-3
C	0.7 - 1.4	7440-44-0
Mo	0 - 1	7439-98-7

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 104:73424 CA
TI Metal strip
IN Davies, Idwal; Bellis, John
PA Mixalloy Ltd., UK
SO Eur. Pat. Appl., 21 pp.
CODEN: EPXXDW
DT Patent
LA English
IC ICM B22F003-22
ICS B22F003-18; C22C032-00
ICA B23K035-40
CC 56-4 (Nonferrous Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 162555	A1	19851127	EP 1985-302282	19850402
	R: AT, BE, CH, DE, FR, GB, IT, LI, LU, NL, SE				
	AU 8540708	A1	19851010	AU 1985-40708	19850329
	AU 568733	B2	19880107		
	ZA 8502483	A	19851127	ZA 1985-2483	19850402
	US 4602954	A	19860729	US 1985-719492	19850404
	JP 60230904	A2	19851116	JP 1985-72473	19850405

PRAI GB 1984-9047 19840407

AB A metallic strip containing discrete particles of ≥1 addnl. dispersed metallic or nonmetallic materials is prepared by forming a homogeneous mix of ductile metallic particles and a minor proportion of metallic and/or nonmetallic particles having chemical and/or phys. properties different from those of the ductile metallic particles. A slurry coating comprising a suspension of the mixed particles in a film forming cellulose derivative is deposited on a moving support surface, dried, and removed from the support surface before being subjected to rolling to effect compaction of the ductile content of the strip and sintering at a temperature at which the metallic particles coalesce to form a matrix containing particles of the addnl. metallic or nonmetallic material(s) which either remain as discrete particles or alloy with the matrix. Thus, for the production of Co-based hard-facing alloy strip, consumables of the Stellite type containing C 0.7-1.4, Cr 26-32, W 3-6, Si ≤2, Ni ≤3, Fe ≤5, Mn ≤2, Mo ≤1%, and Co balance were prepared

ST cobalt hard facing alloy strip
IT 100309-98-6P
RL: PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
(manufacture of brazing strips of)

IT 100310-00-7P
RL: PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
(manufacture of corrosion-resistant strips of)
IT 100309-96-4P 100309-97-5P
RL: PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
(manufacture of hard-facing strips of)
IT 100309-95-3P
RL: PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
(manufacture of strip of)
IT 100309-94-2P
RL: PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
(manufacture of strip of, for hard facing weld cladding)
IT 100309-99-7P
RL: PEP (Physical, engineering or chemical process); PREP (Preparation); PROC (Process)
(manufacture of strips of)

L9 ANSWER 13 OF 20 REGISTRY COPYRIGHT 2005 ACS on STN
RN 89754-92-7 REGISTRY
ED Entered STN: 16 Nov 1984
CN Cobalt alloy, base, Co,B,C,Cr,Fe,Mn,Mo,Ni,Si,W (Stellite 158) (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Carbon alloy, nonbase, Co,B,C,Cr,Fe,Mn,Mo,Ni,Si,W (Stellite 158)
CN Chromium alloy, nonbase, Co,B,C,Cr,Fe,Mn,Mo,Ni,Si,W (Stellite 158)
CN Iron alloy, nonbase, Co,B,C,Cr,Fe,Mn,Mo,Ni,Si,W (Stellite 158)
CN Manganese alloy, nonbase, Co,B,C,Cr,Fe,Mn,Mo,Ni,Si,W (Stellite 158)
CN Molybdenum alloy, nonbase, Co,B,C,Cr,Fe,Mn,Mo,Ni,Si,W (Stellite 158)
CN Nickel alloy, nonbase, Co,B,C,Cr,Fe,Mn,Mo,Ni,Si,W (Stellite 158)
CN Silicon alloy, nonbase, Co,B,C,Cr,Fe,Mn,Mo,Ni,Si,W (Stellite 158)
CN Tungsten alloy, nonbase, Co,B,C,Cr,Fe,Mn,Mo,Ni,Si,W (Stellite 158)
OTHER NAMES:
CN Stellite 158
MF C . B . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI AYS
LC STN Files: CA, CAPLUS
DT.CA CAplus document type: Conference
RL.NP Roles from non-patents: USES (Uses)

Component	Component Percent	Component Registry Number
Co	55 - 69	7440-48-4
Cr	24 - 28	7440-47-3
W	5 - 6	7440-33-7
Fe	0 - 3	7439-89-6
Ni	0 - 3	7440-02-0
Si	1 - 1.5	7440-21-3
C	0.5 - 1	7440-44-0
Mn	0 - 1	7439-96-5
Mo	0 - 1	7439-98-7
B	0.6 - 0.8	7440-42-8

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 100:160235 CA
TI Laser fusing of hardfacing alloy powders

AU Matthews, S. J.
CS Cabot Corp., USA
SO Lasers Mater. Process., Conf. Proc. (1983), 138-48. Editor(s): Metzbower, E. A. Publisher: ASM, Metals Park, Ohio.
CODEN: 51BNAE
DT Conference
LA English
CC 55-6 (Ferrous Metals and Alloys)
AB 1200 W CO2 laser was used for hardfacing by fusion of a preplaced powder paste onto a steel substrate to give a fully solidified deposit 1.0-1.5 mm thick with little base-metal dilution A variety of complex Ni, Co, Fe, and WC alloy hardfacings were readily prepared Satisfactory deposit smoothness and microstructure were achieved by traversing the substrate at 6 in./min under a beam oscillation frequency of 75 Hz. The results were promising for com. use.
ST laser fusion alloy hardfacing; nickel alloy laser hardfacing steel; cobalt alloy laser hardfacing steel; iron alloy laser hardfacing steel; tungsten carbide laser hardfacing steel
IT Laser radiation, chemical and physical effects
(hard-facing by, of steel, by fusion of alloy powders)
IT Coating process
(hard-facing, of steel by laser fusion of alloy powders)
IT 11105-35-4 51141-96-9 89643-98-1 89644-00-8 89657-49-8
89754-92-7 89754-93-8
RL: USES (Uses)
(hardfacing with, on steel, by laser fusion of powder)

L9 ANSWER 14 OF 20 REGISTRY COPYRIGHT 2005 ACS on STN
RN 69911-48-4 REGISTRY
ED Entered STN: 16 Nov 1984
CN Cobalt alloy, base, Co,C,Cr,Fe,Mn,Mo,Ni,Si,W (Haynes 6K) (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Carbon alloy, nonbase, Co,C,Cr,Fe,Mn,Mo,Ni,Si,W (Haynes 6K)
CN Chromium alloy, nonbase, Co,C,Cr,Fe,Mn,Mo,Ni,Si,W (Haynes 6K)
CN Iron alloy, nonbase, Co,C,Cr,Fe,Mn,Mo,Ni,Si,W (Haynes 6K)
CN Manganese alloy, nonbase, Co,C,Cr,Fe,Mn,Mo,Ni,Si,W (Haynes 6K)
CN Molybdenum alloy, nonbase, Co,C,Cr,Fe,Mn,Mo,Ni,Si,W (Haynes 6K)
CN Nickel alloy, nonbase, Co,C,Cr,Fe,Mn,Mo,Ni,Si,W (Haynes 6K)
CN Silicon alloy, nonbase, Co,C,Cr,Fe,Mn,Mo,Ni,Si,W (Haynes 6K)
CN Tungsten alloy, nonbase, Co,C,Cr,Fe,Mn,Mo,Ni,Si,W (Haynes 6K)
OTHER NAMES:
CN Haynes 6K
CN Haynes Stellite 6K
CN STEL6K
CN Stellite 6K
MF C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI AYS
LC STN Files: CA, CAPLUS, USPATFULL
DT.CA CAplus document type: Journal; Patent; Report
RL.P Roles from patents: BIOL (Biological study); USES (Uses)
RL.NP Roles from non-patents: PROC (Process); PRP (Properties); USES (Uses)

Component	Component Percent	Component Registry Number
Co	50 - 57	7440-48-4
Cr	28 - 32	7440-47-3
W	3.5 - 5.5	7440-33-7
Fe	0 - 3	7439-89-6
Ni	0 - 3	7440-02-0
Mn	0 - 2	7439-96-5
Si	0 - 2	7440-21-3
C	1.4 - 1.9	7440-44-0

Mo 0 - 1.5 7439-98-7

6 REFERENCES IN FILE CA (1907 TO DATE)
6 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 139:367395 CA
TI Selection and Evaluation of Heat-Resistant Alloys for SOFC Interconnect Applications
AU Yang, Zhenguo; Weil, K. Scott; Paxton, Dean M.; Stevenson, Jeff W.
CS Pacific Northwest National Laboratory, Richland, WA, 99352, USA
SO Journal of the Electrochemical Society (2003), 150(9), A1188-A1201
CODEN: JESOAN; ISSN: 0013-4651
PB Electrochemical Society
DT Journal
LA English
CC 52-2 (Electrochemical, Radiational, and Thermal Energy Technology)
Section cross-reference(s): 55, 56
AB No specific criteria or inclusive study are available as a reference to help select and evaluate suitable candidates from the hundreds of available heat-resistant alloy compns., which demonstrate oxidation resistance at high temps. In this work, composition criteria have been proposed for the preselection of heat-resistant compns., such as Ni-, Fe-, and Co-based superalloys, Cr-based alloys, and stainless steels. The proposed criteria have been employed to establish a database of heat-resistant alloys at Pacific Northwest National Laboratory, where a systematic approach has been initiated to evaluate and modify and/or develop alloys for solid oxide fuel cell (SOFC) interconnect applications. The preselected compns. are further evaluated by referring inhouse studies and reference to published data. It appears that it would be difficult for traditional alloys to fully satisfy the materials requirements for long-term operation at temps. >700°. However, the applicability can be improved via surface/bulk modification and by the implementation of novel stack designs.
ST alloy heat resistant interconnector solid oxide fuel cell
IT Interconnections, electric
(selection and evaluation of heat-resistant alloys for solid oxide fuel cell interconnect applications)
IT Alloys, uses
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(selection and evaluation of heat-resistant alloys for solid oxide fuel cell interconnect applications)
IT Fuel cells
(solid oxide; selection and evaluation of heat-resistant alloys for solid oxide fuel cell interconnect applications)
IT 11068-72-7, Pyromet 90 11068-84-1, Haynes R-41 11068-87-4, Udimet 500 11068-91-0, Astroloy 11068-93-2, Waspaloy 11109-52-7 11121-96-3, Incoloy 800 12611-78-8 12611-79-9, Stainless steel 410 12611-80-2, Stainless steel 630 12629-05-9 12631-43-5, Inconel 601 12671-88-4, Hastelloy X 12675-92-2, Haynes 188 12682-01-8, Inconel 625 12720-48-8, Nimonic 263 12724-48-0, XM-19 12731-97-4, Stainless steel 635 12731-98-5, Stainless steel 633 12745-19-6, E-Brite 26-1 12766-43-7, Incoloy 825 37241-55-7 37241-61-5, Stainless steel 309S 37245-99-1, RA-330 51367-47-6, 19-9DL 51836-03-4 54385-90-9, Inconel 690 54824-47-4, AL444 56507-68-7, Stainless steel 440A 59316-28-8, IN 939 60005-36-9, AL 29-4 60382-27-6, Carpenter 443 61431-59-2 62112-97-4, Inconel MA 754 62112-98-5, MA 956 65107-55-3, AL 29-4-2 65555-57-9, Pyromet 31 66020-80-2, IN MA-6000E 66776-05-4, Carpenter 68467-51-6, R30556 69911-48-4, Haynes 6K 70727-99-0, Fecralloy 74010-05-2, AL 255 77660-13-0, Sea Cure 84721-58-4, 20Mo-6 85555-38-0, XM-30 88507-81-7, Haynes 214 94076-32-1, Haynes 230 98686-65-8, Hastelloy C-22 100503-24-0, Hastelloy G-30 100919-68-4, 7Mo+N 125434-06-2, Haynes HR-160 128985-61-5, Kanthal APM 138388-24-6, Haynes HR-120

144794-41-2, Nicrofer 6025HT 157451-84-8, Ducrolloy 160370-65-0, AiResist 13c 188734-88-5, Hastelloy C-2000 481636-44-6, Durafoil 620170-52-7, C207 620170-53-8, Chrome 90 620170-54-9, Carpenter 27 620170-55-0, AL453 620170-56-1, UNS S43300 620170-57-2, UNS S46800 620170-58-3, AL441HP

RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)

(selection and evaluation of heat-resistant alloys for solid oxide fuel cell interconnect applications)

RE.CNT 92 THERE ARE 92 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Ahmed, K; Solid Oxide Fuel Cells, The Electrochemical Proceedings Series 2001, V2001-16, P904 CAPLUS
(2) Akiyama, Y; J Power Sources 1994, V50, P361 CAPLUS
(3) Anderson, J; CALPHAD: Comput Coupling Phase Diagrams Thermochem 1987, V11, P83
(4) Anon; Metals Handbook, Vol 3: Properties and Selection:Stainless Steels, Tool Materials and Special Purpose Materials 1980
(5) Badwal, S; Proceedings of the 3rd European Solid Oxide Fuel Cell Forum, The European SOFC Forum 1998, V1, P105
(6) Badwal, S; Solid State Ionics 1997, V99, P297 CAPLUS
(7) Batawi, E; Solid Oxide Fuel Cells, The Electrochemical Society Proceedings Series 1999, V99-19, P767 CAPLUS
(8) Birks, N; J Inst Met 1961, V91, P308
(9) Blum, L; Proceedings of the 5th European Solid Oxide Fuel Cell Forum, The European SOFC Forum 2002, P784
(10) Borchardt, G; On Deviations from Parabolic Growth Kinetics in High Temperatures Oxidation, Report 1991, P1
(11) Brylewski, T; Solid State Ionics 2001, V143, P131 CAPLUS
(12) Buchkremer, H; Proceedings of the 3rd European Solid Oxide Fuel Cell Forum, The European SOFC Forum 1998, V1, P143
(13) Buckner, B; Solid Oxide Fuel Cells, The Electrochemical Proceedings Series 1993, V93-4, P641
(14) Carpenter Technology Corporation; Alloy Data:Carpenter 21Cr-6Ni-9Mn, Product Report, http://www.cartech.com 2000
(15) Chick, L; Proceedings of the 2nd International Symposium on Solid Oxide Fuel Cells 1991, P261
(16) Chick, L; Solid Oxide Fuel Cells, The Electrochemical Proceedings Series 2003, V2003-07, P88
(17) de Souza, S; J Electrochem Soc 1997, V144, PL35 CAPLUS
(18) de Souza, S; Solid State Ionics 1997, V98, P57 CAPLUS
(19) Devereux, O; Topics in Metallurgical Thermodynamics 1998, P392
(20) Diethelm, R; Solid Oxide Fuel Cells, The Electrochemical Society Proceedings Series 1999, V99-19, P60 CAPLUS
(21) Donachie, M; Superalloy Source Book 1984, P10
(22) England, D; J Electrochem Soc 1999, V146, P3196 CAPLUS
(23) England, D; J Electrochem Soc 2001, V148, PA330 CAPLUS
(24) Giggins, G; Trans Metall Soc AIME 1969, V245, P2495
(25) Gindorf, C; Fortschr-Ber VDI 2000, V15, P723 CAPLUS
(26) Hauffe, K; Oxidation of Metals 1965
(27) Hilpert, K; J Electrochem Soc 1996, V143, P3642 CAPLUS
(28) Hindam, H; Oxid Met 1990, V18, P245
(29) Holt, A; Solid State Ionics 1994, V69, P127 CAPLUS
(30) Holt, A; Solid State Ionics 1994, V69, P137 CAPLUS
(31) Holt, A; Solid State Ionics 1997, V100, P201 CAPLUS
(32) Honegger, K; Solid Oxide Fuel Cells, The Electrochemical Society Proceedings Series 2001, V2001-1b, P803
(33) Horita, T; J Electrochem Soc 2003, V150, PA243 CAPLUS
(34) Hou, P; Mater Sci Eng, A 1995, V202, P1
(35) Hou, P; Solid Oxide Fuel Cells, The Electrochemical Society Proceedings Series 1999, V99-19, P737 CAPLUS
(36) Huang, K; Mater Res Bull 2001, V36, P81 CAPLUS
(37) Huang, K; Solid State Ionics 2000, V129, P237 CAPLUS
(38) Huang, Q; J Am Ceram Soc 1998, V81, P2565
(39) Ishihara, H; J Am Chem Soc 1994, V116, P3801

(40) Jaffrey, D; US 6294131 2001 CAPLUS
(41) Jedlinski, J; Solid State Ionics 1997, V101, P1147
(42) Jha, S; US 5366139 1994
(43) Jha, S; US 5516383 1996 CAPLUS
(44) Kadowaki, T; Solid State Ionics 1993, V67, P65 CAPLUS
(45) Keown, S; Stainless Steels '87 Conference Proceeding 1988, P345 CAPLUS
(46) Klueh, R; Trans Metall Soc AIME 1968, V242, P237 CAPLUS
(47) Kock, W; Proceedings of the 1st European Solid Oxide Fuel Cell Forum, The European SOFC Forum 1994, P703
(48) Kofstad, P; High Temperature Corrosion 1988
(49) Kofstad, P; J Electrochem Soc 1969, V116, P1542 CAPLUS
(50) Kofstad, P; J Electrochem Soc 1969, V116, P224 CAPLUS
(51) Kofstad, P; J Electrochem Soc 1969, V116, P229 CAPLUS
(52) Kofstad, P; Nonstoichometry, Diffusion and Electrical Conductivity in Binary Metal Oxides 1972
(53) Kofstad, P; Proceedings of the 2nd European Solid Oxide Fuel Cell Forum, The European SOFC Forum 1996, P479
(54) Kofstad, P; Solid State Ionics 1992, V52, P69 CAPLUS
(55) Larring, Y; J Electrochem Soc 2000, V147, P3251 CAPLUS
(56) Larry, P; Private communication
(57) Lillerud, K; J Electrochem Soc 1980, V127, P2397 CAPLUS
(58) Linderoth, S; J Mater Sci 1996, V31, P5077 CAPLUS
(59) Linderoth, S; Surf Coat Technol 1996, V80, P185 CAPLUS
(60) Lula, R; Stainless Steels 1986
(61) Malkow, T; Solid Oxide Fuel Cells, The Electrochemical Society Proceedings Series 1997, V97-40, P1244 CAPLUS
(62) Matsui, T; J Nucl Mater 1984, V120, P115 CAPLUS
(63) Matsuzaki, Y; J Electrochem Soc 2001, V148, PA126 CAPLUS
(64) Matsuzaki, Y; Solid State Ionics 2000, V132, P271 CAPLUS
(65) Meinhardt, K; US 6430966 2002 CAPLUS
(66) Meulenberg, W; J Mater Sci 2001, V36, P3189 CAPLUS
(67) Mihn, N; J Am Ceram Soc 1994, V76, P563
(68) Mori, M; Solid Oxide Fuel Cells, The Electrochemical Society Proceedings Series 1999, V99-19, P707
(69) Moseley, P; Corros Sci 1984, V24, P547 CAPLUS
(70) Park, J; Oxid Met 1990, V33, P31 CAPLUS
(71) Piron-Abellan, J; Proceedings of the 5th European Solid Oxide Fuel Cell Forum, The European SOFC Forum 2002, P248
(72) Piron-Abellan, J; Solid Oxide Fuel Cells, The Electrochemical Society Proceedings Series 2001, V2001-16, P811
(73) Pistorius, C; Z Kristallogr 1962, V117, P259 CAPLUS
(74) Quadakkers, W; Proceedings of the 2nd European Solid Oxide Fuel Cell Forum, The European SOFC Forum 1994, P525
(75) Quadakkers, W; Proceedings of the 2nd European Solid Oxide Fuel Cell Forum, The European SOFC Forum 1996, P297
(76) Quadakkers, W; Proceedings of the 4th European Solid Oxide Fuel Cell Forum, The European SOFC Forum 2000, V2, P827
(77) Quadakkers, W; Solid State Ionics 1996, V91, P55 CAPLUS
(78) Shiomitsu, T; Solid Oxide Fuel Cells, The Electrochemical Proceedings Series 1995, V95-1, P851
(79) Sims, C; 69-GT-16 1969
(80) Singh, P; Scr Mater, Submitted
(81) Steele, B; Nature (London) 2001, V414, P345 CAPLUS
(82) Stover, D; Solid Oxide Fuel Cells, The Electrochemical Proceedings Series 1999, V99-19, P812 CAPLUS
(83) Taniguchi, S; J Power Sources 1995, V55, P73 CAPLUS
(84) Tedmon, C; J Electrochem Soc 1969, V116, P1170
(85) Teller, O; Solid Oxide Fuel Cells, The Electrochemical Proceedings Series 2001, V2001-16, P895 CAPLUS
(86) Wagner, C; Atom Movements 1951
(87) Wasielewski, G; High Temperature Oxidation, in The Superalloys 1972, P287 CAPLUS
(88) Yamazaki, Y; Solid Oxide Fuel Cells, The Electrochemical Society Proceedings Series 1997, V97-40, P1291 CAPLUS

(89) Yang, Z; Electrochem Solid-State Lett, In press
(90) Yang, Z; J Electrochem Soc, In press
(91) Yang, Z; Solid State Ionics, In press
(92) Yang, Z; Unpublished work

REFERENCE 2

AN 122:89505 CA
TI Cobalt base alloy end effectors for laparoscopic surgical scissors
IN Smith, Kevin W.; Bales, Thomas O.
PA Symbosis Corp., USA
SO Pat. Specif. (Aust.), 29 pp.
CODEN: ALXXAP
DT Patent
LA English
IC ICM A61L031-00
ICS A61B017-32; C22C019-07
CC 63-7 (Pharmaceuticals)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	AU 653305	B2	19940922	AU 1992-27154	19921020
	AU 9227154	A1	19930422		

PRAI US 1991-780034 19911021
AB End effector scissor elements for laparoscopic surgical instruments are provided in the form of investment case cobalt base alloy elements. The cobalt base alloy scissor elements are homogeneous in composition. Each element has in its as-cast form an elongate portion having an integral cutting edge. At least one of the scissor elements also has a through-hole transverse to the elongate portion. The scissor elements are arranged as scissor cutting instruments by opposing their cutting edges, and by engaging the through-hole of each pivoting element with apparatus coupled to an actuating push-rod of the laparoscopic surgical instrument. The preferred cobalt base alloy is a cobalt base superalloy with at least 38% cobalt, and preferably 50% or more cobalt. The cobalt base alloy should be sufficiently hard to scratch stainless steel.
ST cobalt alloy laparoscopy surgical scissors
IT Medical goods
(laparoscopic surgical scissors; cobalt base alloy end effectors for laparoscopic surgical scissors)
IT Cobalt alloy, base
RL: THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(cobalt base alloy end effectors for laparoscopic surgical scissors)
IT 12605-92-4, Haynes 25 12629-02-6 12629-04-8, Mar-M509 12638-07-2 12671-96-4, Haynes Stellite 6B 12675-92-2, Haynes 188 37302-07-1, FSX 414 37359-99-2 39367-33-4 59798-01-5, MAR-M 302 63542-69-8, MAR-M 322 69911-48-4 160370-65-0 160370-67-2
RL: THU (Therapeutic use); BIOL (Biological study); USES (Uses)
(cobalt base alloy end effectors for laparoscopic surgical scissors)

REFERENCE 3

AN 108:171555 CA
TI High temperature corrosion of alloys in a simulated coal gasification atmosphere
AU Okada, Michiya; Usami, Ken'ichi; Morimoto, Tadaoki
CS Hitachi Res. Lab., Hitachi, Ltd., Hitachi, 317, Japan
SO Tetsu to Hagane (1988), 74(2), 350-7
CODEN: TEHAA2; ISSN: 0371-6279
DT Journal
LA Japanese
CC 55-10 (Ferrous Metals and Alloys)
Section cross-reference(s): 51, 56
AB The corrosion resistance of com. grade stainless steels, Fe-base, Ni-base,

and Co-base alloys and that of the pack coated alloys with Cr, Al, or Si were investigated in a simulated coal gasification atmospheric at 200-850° for 100-500 h. Fe- and Co-base alloys and high Cr (>20%) stainless steels exhibited good corrosion resistance to S attack. Ni-base alloys were rapidly sulfurized at >600°. Pack aluminizing of alloys with high Cr was the most effective in improving the resistance to sulfidation attack compared with pack chromizing and pack siliconizing. To clarify the effects of alloying elements on S attack, addnl. exptl. heats in which the content of Cr, Ni, Co, and Al was individually changed were examined in the same corrosive condition. Addition of Cr, Co, or Al to Fe-Cr alloys was effective against sulfidation. The addition of 2-3% of Al to Fe-Cr or Fe-Cr-Ni alloys promoted the formation of a protective oxide scale. A discussion was made on the effect of these alloying elements in Fe-base alloys on the corrosion behavior in the coal gasification atmospheric

ST corrosion coal gasifier atm; stainless steel corrosion coal gasifier; iron alloy corrosion coal gasifier; nickel alloy corrosion coal gasifier; cobalt alloy corrosion coal gasifier; chromized alloy corrosion coal gasifier; silicided alloy corrosion coal gasifier; aluminized alloy corrosion coal gasifier

IT Coal gasification
(apparatus, iron- and nickel- and cobalt-base alloys for, high temperature corrosion of)

IT Aluminizing
Chromizing
Siliconization
(pack, of stainless steel, hot corrosion resistance from, with respect to coal gasifiers)

IT 7429-90-5
RL: USES (Uses)
(aluminizing, pack, of stainless steel, hot corrosion resistance from, with respect to coal gasifiers)

IT 7440-47-3
RL: USES (Uses)
(chromizing, pack, of stainless steel, hot corrosion resistance from, with respect to coal gasifiers)

IT 11109-50-5, SUS 304 11109-52-7, SUS 430 11109-82-3 12606-02-9, IN600 12618-64-3, SUH 661 12618-67-6, S816 12629-05-9, SUH 446 12671-82-8, SUH 660 12675-92-2, HAY 188 12725-20-1, SUS 347 37202-69-0, SUS 405 37322-28-4, IN617 39367-38-9 54385-90-9 55452-39-6 60616-02-6 65631-45-0, Chromium 49, iron 51 69911-48-4, STEL6K 72147-97-8 79330-34-0, Chromium 38, iron 62 98357-44-9 113879-28-0, Aluminum 4.8, cerium 0.2, chromium 18, iron 69, nickel 8 113879-29-1, Aluminum 2.3, chromium 18, iron 72, nickel 8 113879-30-4, Aluminum 0.1, cerium 0.2, chromium 18, iron 74, nickel 8 113879-31-5, Aluminum 4.8, cerium 0.2, chromium 25, iron 50, nickel 20 113879-32-6, Aluminum 2.3, chromium 26, iron 52, nickel 20 113879-33-7, Aluminum 0.1, cerium 0.1, chromium 28, iron 53, nickel 19 113879-34-8, Chromium 30, cobalt 40, iron 11, nickel 19 113879-35-9, Aluminum 0.1, chromium 30, cobalt 30, iron 21, nickel 19 113879-36-0, Aluminum 0.2, chromium 30, cobalt 20, iron 31, nickel 19 113879-37-1, Aluminum 0.1, chromium 30, cobalt 9.9, iron 40, nickel 20 113879-38-2, Aluminum 14, chromium 30, iron 56 113879-39-3, Aluminum 2.4, chromium 30, iron 68 113879-40-6, Chromium 30, iron 31, nickel 39 113879-41-7, Chromium 30, iron 41, nickel 29 113879-42-8, Chromium 30, iron 51, nickel 19 113879-43-9, Chromium 9.7, iron 90
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(corrosion of, in hot coal gasifier atmospheric)

IT 37301-67-0, SUS 310S
RL: PEP (Physical, engineering or chemical process); PROC (Process)
(corrosion of, in hot coal gasifier atmospheric, aluminizing and chromizing and siliconizing with respect to)

IT 7440-21-3
RL: USES (Uses)
(siliconization, pack, of stainless steel, hot corrosion resistance

from, with respect to coal gasifiers)

REFERENCE 4

AN 100:55595 CA
TI Properties and performance of candidate structural metals for the production of synthetic gas from coal
AU Christ, Bruce; Ondik, Helen; Perloff, Alvin; Beck, Betty
CS Cent. Mater. Sci., Natl. Bur. Stand., USA
SO Proceedings of the International Gas Research Conference (1983) 456-70
CODEN: PGRCDV; ISSN: 0736-5721
DT Journal
LA English
CC 56-10 (Nonferrous Metals and Alloys)
Section cross-reference(s): 51
AB A data base was accumulated to describe performance of .apprx.60 alloys under the severe operating conditions of coal gasification. The data bases which include laboratory results, results from specimens exposed in critical plant locations, and results of plant experience as described in failure anal. reports provides an opportunity to initiate development of structural stds. in coal gasification.
ST coal gasification alloy performance; std coal gasification alloy
IT Coal gasification
(alloy corrosion and erosion in, mech. properties in relation to)
IT Corrosion
(in coal gasification)
IT Erosion
(of alloys, in coal gasification)
IT 7440-32-6, reactions 11068-77-2 11097-15-7, reactions 11105-19-4
11105-33-2 11105-35-4 11107-04-3 11109-50-5 11109-52-7
11114-34-4 11121-96-3 11146-12-6 12605-30-0 12605-85-5
12605-92-4 12611-79-9 12616-75-0 12618-64-3 12629-05-9
12631-43-5 12638-07-2 12671-96-4 12675-92-2 12675-93-3
12724-48-0 12725-28-9 12743-70-3 12745-19-6 12766-43-7
37188-12-8 37222-93-8 37245-99-1 37270-35-2 37301-85-2
39362-68-0 39367-32-3 39368-24-6 39369-78-3 55014-15-8
55938-37-9 56273-47-3 56298-58-9 60540-13-8 60616-02-6
64056-14-0 69911-48-4 70251-39-7 72847-72-4, reactions 73826-94-5
88505-69-5 88505-74-2, properties 125352-77-4
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(corrosion and mech. properties of, in coal gasification)

REFERENCE 5

AN 91:179676 CA
TI Relative erosion resistance of several materials
AU Hansen, J. S.
CS Albany Metall. Res. Cent., Fed. Bur. Mines, Albany, OR, 97321, USA
SO ASTM Spec. Tech. Publ. (1979), Volume Date 1977, STP 664, Erosion: Prev. Useful Appl., 148-62
CODEN: ASTTA8; ISSN: 0066-0558
DT Report
LA English
CC 56-7 (Nonferrous Metals and Alloys)
Section cross-reference(s): 51, 57
AB Erosion resistance of alloys, cermets, ceramics, and coatings was determined relative to Stellite 6B [12671-96-4] controls for abrasion by 27 μ alumina particles at 20 and 700°, and 170 m/s impingement in N. Over 200 samples were screened by the erosion test to determine their suitability for coal gasifier valves. The alloys had similar wear with low erosion rates. Ceramics and cermets such as B4C, WC, SiC, Si3N4, and TiB2, if manufactured to minimize porosity, had >4 times the erosion resistance

of alloys. Coatings such as boronized Mo and tungsten carbide, chemical vapor-deposited TiCN, and electrodeposited TiB2 also proved highly erosion resistant when applied at 50-80 μ thickness. The cermet binder content and ceramic porosity were related to erosion resistance.

ST erosion resistance alloy ceramic; alloy erosion resistance alumina; cermet erosion resistance alumina; ceramic erosion resistance alumina; coating erosion resistance alumina; carbide erosion resistance alumina; oxide erosion resistance alumina; binder erosion resistance alumina; porosity erosion resistance alumina; metal erosion resistance alumina; boron carbide erosion alumina; tungsten carbide erosion alumina; silicon carbide erosion alumina; nitride silicon erosion resistance; titanium diboride erosion resistance; carbonitride titanium erosion resistance; molybdenum erosion resistance

IT Ceramic materials and wares
Cermets
Coating materials
(erosion resistance of, screening for, with alumina)

IT Alloys, properties
Metals, properties
RL: PRP (Properties)
(erosion resistance of, screening for, with alumina)

IT Abrasion-resistant materials
(screening test for, with alumina powder impingement)

IT Wear
(erosion, of materials, by alumina particles, screening test for)

IT Valves
(gasifier, materials for, erosion screening of, with alumina)

IT 1344-28-1, uses and miscellaneous
RL: USES (Uses)
(erosion by, screening for, of alloys and ceramics)

IT 409-21-2, properties 1308-31-2 1308-38-9, properties 1344-28-1, properties 7439-98-7, properties 7440-33-7, properties 7782-40-3, properties 11105-33-2 11105-35-4 11107-04-3 11109-50-5 11109-52-7 11121-90-7, properties 11121-96-3 12033-89-5, properties 12045-63-5 12069-32-8 12070-12-1 12347-09-0 12604-75-0 12605-30-0 12605-92-4 12606-02-9 12611-73-3 12629-05-9 12638-07-2 12671-96-4 12675-92-2 12741-53-6 12743-70-3 37245-99-1 39368-24-6 39463-26-8 56273-47-3 58251-35-7 60616-02-6 63551-70-2 67479-38-3 69911-48-4 70251-39-7 71639-62-8 71646-23-6 71662-78-7 71662-79-8 71664-69-2 71673-74-0 71717-56-1 71717-57-2 71789-25-8
RL: PRP (Properties)
(erosion of, by alumina particles)

REFERENCE 6

AN 90:172873 CA
TI Aqueous slurry erosion in some cobalt base superalloys
AU Miller, A. E.; Coyle, J. P.
CS Dep. Metall. Eng. Mater. Sci., Univ. Notre Dame, Notre Dame, IN, USA
SO Metallurgical Transactions A: Physical Metallurgy and Materials Science (1978), 9A(12), 1777-81
CODEN: MTTABN; ISSN: 0360-2133
DT Journal
LA English
CC 56-7 (Nonferrous Metals and Alloys)
AB An orifice erosion test was used to study the influence of metallurgical variables in a series of Co superalloys on their resistance to erosion by aqueous slurries of SiO2. A slurry of 30% solids by weight of 4.5 μ SiO2 was used to erode a variety of microstructures obtained by compositional and processing control. The time dependence of the pressure drop across an orifice (P) followed the relation P = Kt-n, where t is time (min), and K and n are consts. The erosion exponent, n, varied from 0.052 to 0.148 and was dependent upon C content and processing variables.

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ST   cobalt superalloy slurry erosion
IT   11105-33-2   11105-35-4   12671-96-4   69911-47-3   69911-48-4
     RL: PROC (Process)
        (aqueous slurry erosion of, microstructures in relation to)

L9   ANSWER 15 OF 20  REGISTRY  COPYRIGHT 2005 ACS on STN
RN   68873-68-7  REGISTRY
ED   Entered STN:  16 Nov 1984
CN   Cobalt alloy, base, Co 52-69,Cr 27-31,C 0.9-9.4,W 3.5-5.5,Fe 0-3,Ni 0-3,Mo
     0-1.5,Si 0-1.5,Mn 0-1 (9CI)  (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN   Carbon alloy, nonbase, Co 52-69,Cr 27-31,C 0.9-9.4,W 3.5-5.5,Fe 0-3,Ni
     0-3,Mo 0-1.5,Si 0-1.5,Mn 0-1
CN   Chromium alloy, nonbase, Co 52-69,Cr 27-31,C 0.9-9.4,W 3.5-5.5,Fe 0-3,Ni
     0-3,Mo 0-1.5,Si 0-1.5,Mn 0-1
CN   Iron alloy, nonbase, Co 52-69,Cr 27-31,C 0.9-9.4,W 3.5-5.5,Fe 0-3,Ni
     0-3,Mo 0-1.5,Si 0-1.5,Mn 0-1
CN   Manganese alloy, nonbase, Co 52-69,Cr 27-31,C 0.9-9.4,W 3.5-5.5,Fe 0-3,Ni
     0-3,Mo 0-1.5,Si 0-1.5,Mn 0-1
CN   Molybdenum alloy, nonbase, Co 52-69,Cr 27-31,C 0.9-9.4,W 3.5-5.5,Fe 0-3,Ni
     0-3,Mo 0-1.5,Si 0-1.5,Mn 0-1
CN   Nickel alloy, nonbase, Co 52-69,Cr 27-31,C 0.9-9.4,W 3.5-5.5,Fe 0-3,Ni
     0-3,Mo 0-1.5,Si 0-1.5,Mn 0-1
CN   Silicon alloy, nonbase, Co 52-69,Cr 27-31,C 0.9-9.4,W 3.5-5.5,Fe 0-3,Ni
     0-3,Mo 0-1.5,Si 0-1.5,Mn 0-1
CN   Tungsten alloy, nonbase, Co 52-69,Cr 27-31,C 0.9-9.4,W 3.5-5.5,Fe 0-3,Ni
     0-3,Mo 0-1.5,Si 0-1.5,Mn 0-1
MF   C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI   AYS
LC   STN Files:   CA, CAPLUS, IFICDB, IFIPAT, IFIUDB, USPATFULL
DT.CA  CAplus document type:  Patent
RL.P   Roles from patents:  USES (Uses)
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Component	Component Percent	Component Registry Number
Co	52 - 69	7440-48-4
Cr	27 - 31	7440-47-3
C	0.9 - 9.4	7440-44-0
W	3.5 - 5.5	7440-33-7
Fe	0 - 3	7439-89-6
Ni	0 - 3	7440-02-0
Mo	0 - 1.5	7439-98-7
Si	0 - 1.5	7440-21-3
Mn	0 - 1	7439-96-5

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             1 REFERENCES IN FILE CA (1907 TO DATE)
             1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE  1

AN   90:42877  CA
TI   Injection molding powder metal parts
IN   Rivers, Ronald D.
PA   Cabot Corp., USA
SO   U.S., 3 pp.
     CODEN: USXXAM
DT   Patent
LA   English
IC   B22F003-14
NCL  075214000
CC   56-3 (Nonferrous Metals and Alloys)
FAN.CNT 1
     PATENT NO.        KIND  DATE            APPLICATION NO.  DATE
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PI   US 4113480        A    19780912       US 1976-748821   19761209
PRAI US 1976-748821    19761209
AB   Self-supporting compacts of metal powder, e.g.  Co superalloy
     [68873-68-7], having a green d. 48-50% theor. are prepared by mixing -325
     mesh atomized powder with a plastic medium consisting of Me cellulose
     [9004-67-5] 2.0, glycerol  [56-81-5] 1.0, H3BO3 0.5, and H2O 4.5% (metal
     powder basis).  Since the organic binder is soluble at room temperature and
less soluble
     at high temps., the medium viscosity in increased at high temps.  The
     mixture is injected under pressure at room temperature into a preheated closed
     die.  Solvent is rejected from the mixts., and the molded shape ejected
     from the die cavity.  The compact is dried, and the resulting
     interconnected porosity permits escape of gases during sintering.
ST   powder metallurgy injection molding; cobalt superalloy injection molding
IT   Powder metallurgy
        (injection molding in, plastic medium for)
IT   56-81-5, properties   9004-67-5   10043-35-3, properties
     RL: PRP (Properties)
        (injection molding of powder metallurgy parts with plastic media
        containing)
IT   68873-68-7
     RL: USES (Uses)
        (injection molding of powder, plastic medium for)

L9   ANSWER 16 OF 20  REGISTRY  COPYRIGHT 2005 ACS on STN
RN   60281-32-5  REGISTRY
ED   Entered STN:  16 Nov 1984
CN   Cobalt alloy, base, Co 48-67,Cr 28-32,W 3.5-5.5,Fe 0-3,Ni 0-3,Mn 0-2,Si
     0-2,C 1.4-1.9,Mo 0-1.5,B 0-1 (9CI)  (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN   Boron alloy, nonbase, Co 48-67,Cr 28-32,W 3.5-5.5,Fe 0-3,Ni 0-3,Mn 0-2,Si
     0-2,C 1.4-1.9,Mo 0-1.5,B 0-1
CN   Carbon alloy, nonbase, Co 48-67,Cr 28-32,W 3.5-5.5,Fe 0-3,Ni 0-3,Mn 0-2,Si
     0-2,C 1.4-1.9,Mo 0-1.5,B 0-1
CN   Chromium alloy, nonbase, Co 48-67,Cr 28-32,W 3.5-5.5,Fe 0-3,Ni 0-3,Mn
     0-2,Si 0-2,C 1.4-1.9,Mo 0-1.5,B 0-1
CN   Iron alloy, nonbase, Co 48-67,Cr 28-32,W 3.5-5.5,Fe 0-3,Ni 0-3,Mn 0-2,Si
     0-2,C 1.4-1.9,Mo 0-1.5,B 0-1
CN   Manganese alloy, nonbase, Co 48-67,Cr 28-32,W 3.5-5.5,Fe 0-3,Ni 0-3,Mn
     0-2,Si 0-2,C 1.4-1.9,Mo 0-1.5,B 0-1
CN   Molybdenum alloy, nonbase, Co 48-67,Cr 28-32,W 3.5-5.5,Fe 0-3,Ni 0-3,Mn
     0-2,Si 0-2,C 1.4-1.9,Mo 0-1.5,B 0-1
CN   Nickel alloy, nonbase, Co 48-67,Cr 28-32,W 3.5-5.5,Fe 0-3,Ni 0-3,Mn 0-2,Si
     0-2,C 1.4-1.9,Mo 0-1.5,B 0-1
CN   Silicon alloy, nonbase, Co 48-67,Cr 28-32,W 3.5-5.5,Fe 0-3,Ni 0-3,Mn
     0-2,Si 0-2,C 1.4-1.9,Mo 0-1.5,B 0-1
CN   Tungsten alloy, nonbase, Co 48-67,Cr 28-32,W 3.5-5.5,Fe 0-3,Ni 0-3,Mn
     0-2,Si 0-2,C 1.4-1.9,Mo 0-1.5,B 0-1
MF   C . B . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI   AYS
LC   STN Files:   CA, CAPLUS, IFICDB, IFIPAT, IFIUDB, USPATFULL
DT.CA  CAplus document type:  Patent
RL.P   Roles from patents:  USES (Uses)
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Component	Component Percent	Component Registry Number
Co	48 - 67	7440-48-4
Cr	28 - 32	7440-47-3
W	3.5 - 5.5	7440-33-7
Fe	0 - 3	7439-89-6
Ni	0 - 3	7440-02-0
Mn	0 - 2	7439-96-5

Si	0	-	2	7440-21-3
C	1.4	-	1.9	7440-44-0
Mo	0	-	1.5	7439-98-7
B	0	-	1	7440-42-8

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 85:111869 CA
TI Powder metallurgy cobalt alloy sheet containing dispersed carbide particles
PA Cabot Corp., USA
SO Fr. Demande, 14 pp.
CODEN: FRXXBL
DT Patent
LA French
IC C22C019-05
CC 56-3 (Nonferrous Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	FR 2271300	A1	19751212	FR 1975-15697	19750520
	FR 2271300	B1	19810828		
	US 3966422	A	19760629	US 1974-470746	19740517
	CA 1052136	A1	19790410	CA 1975-227157	19750516
	DE 2522073	A1	19751127	DE 1975-2522073	19750517
	SE 7505709	A	19751118	SE 1975-5709	19750520

PRAI US 1974-470746 19740517
AB Co alloy [60281-32-5] sheet is prepared by hot rolling of hot-pressed prealloyed atomized powder containing Cr 28-32, W 3.5-5.5, C 1.4-1.9, Mo ≤1.5, Mn ≤2, Fe ≤3, Si ≤2, Ni ≤3, and B ≤1%. The sheet contains a uniform dispersion of carbide particles ≤10μ diameter in a solid solution matrix. The atomized powder ≤0.59 mm diameter is subjected to vacuum and isostatically hot pressed to ≥95% theor. d. at 1150° to slabs weighing over 60 kg. The slabs ≥38 mm thick are hot rolled to 6.35-25 mm at 1175°. Initial redns. of 1% per pass are increased to 10%.
ST cobalt alloy sintered sheet; carbide dispersion cobalt sheet
IT 60281-32-5
RL: USES (Uses)
(powder metallurgy sheet of, containing dispersed carbide phase)

L9 ANSWER 17 OF 20 REGISTRY COPYRIGHT 2005 ACS on STN
RN 54425-10-4 REGISTRY
ED Entered STN: 16 Nov 1984
CN Cobalt alloy, base, Co 38-64,Cr 25-32,W 3-14,Fe 0-5,Ni 3,C 0.9-3,Si 2,Mn 1-2,Mo 1 (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Carbon alloy, nonbase, Co 38-64,Cr 25-32,W 3-14,Fe 0-5,Ni 3,C 0.9-3,Si 2,Mn 1-2,Mo 1
CN Chromium alloy, nonbase, Co 38-64,Cr 25-32,W 3-14,Fe 0-5,Ni 3,C 0.9-3,Si 2,Mn 1-2,Mo 1
CN Iron alloy, nonbase, Co 38-64,Cr 25-32,W 3-14,Fe 0-5,Ni 3,C 0.9-3,Si 2,Mn 1-2,Mo 1
CN Manganese alloy, nonbase, Co 38-64,Cr 25-32,W 3-14,Fe 0-5,Ni 3,C 0.9-3,Si 2,Mn 1-2,Mo 1
CN Molybdenum alloy, nonbase, Co 38-64,Cr 25-32,W 3-14,Fe 0-5,Ni 3,C 0.9-3,Si 2,Mn 1-2,Mo 1
CN Nickel alloy, nonbase, Co 38-64,Cr 25-32,W 3-14,Fe 0-5,Ni 3,C 0.9-3,Si 2,Mn 1-2,Mo 1
CN Silicon alloy, nonbase, Co 38-64,Cr 25-32,W 3-14,Fe 0-5,Ni 3,C 0.9-3,Si 2,Mn 1-2,Mo 1

CN Tungsten alloy, nonbase, Co 38-64,Cr 25-32,W 3-14,Fe 0-5,Ni 3,C 0.9-3,Si 2,Mn 1-2,Mo 1
MF C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI AYS
LC STN Files: CA, CAPLUS
DT.CA CAplus document type: Journal
RL.NP Roles from non-patents: USES (Uses)

Component	Component Percent	Component Registry Number
Co	38 - 64	7440-48-4
Cr	25 - 32	7440-47-3
W	3 - 14	7440-33-7
Fe	0 - 5	7439-89-6
Ni	3	7440-02-0
C	0.9 - 3	7440-44-0
Si	2	7440-21-3
Mn	1 - 2	7439-96-5
Mo	1	7439-98-7

1 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 81:157451 CA
TI Arc-[weld] repairing with cobalt-chromium-x [carbon and other elements] alloys
AU Van Muysen, L.
CS K.V.T.I., Mechelen, Belg.
SO Arcos (1974), 162, 4365-80
CODEN: ARCOA3; ISSN: 0365-6012
DT Journal
LA French
CC 56-9 (Nonferrous Metals and Alloys)
AB A filled wire electrode was developed for hard surfacing of new and used parts by arc welding. An improved arc welding wire was produced by forming Co strip to a tube with longitudinal seam and simultaneously filling it with alloying elements (Cr, W, C, Mo, Ni). The filled tube was then cold drawn to 3.2 mm diameter Application of the filled wire to submerged arc welding and metal arc welding with protective gas is described. The structure of single and triple layer deposits, influence of Fe dissolution, and hardness as a function of depth were determined for both methods. Examples are given for the industrial use of the wire.
ST welding repair surfacing electrode; cobalt alloy welding electrode
IT Welding
(electrodes, cobalt-chromium alloys for hard facing)
IT 54425-09-1 54425-10-4 54500-11-7
RL: USES (Uses)
(for welding rods for hard-facing)
IT 7440-48-4, uses and miscellaneous
RL: USES (Uses)
(tubes for welding compns. for hard-facing)

L9 ANSWER 18 OF 20 REGISTRY COPYRIGHT 2005 ACS on STN
RN 12671-96-4 REGISTRY
ED Entered STN: 16 Nov 1984
CN Cobalt alloy, base, Co 47-69,Cr 27-33,W 3.0-6.0,Fe 0-3.0,Ni 0-3.0,Mn 0-2.5,Mo 0.5-2.0,Si 0-2.0,C 0.6-1.5 (UNS R30016) (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Carbon alloy, nonbase, Co 47-69,Cr 27-33,W 3.0-6.0,Fe 0-3.0,Ni 0-3.0,Mn 0-2.5,Mo 0.5-2.0,Si 0-2.0,C 0.6-1.5 (UNS R30016)
CN Chromium alloy, nonbase, Co 47-69,Cr 27-33,W 3.0-6.0,Fe 0-3.0,Ni 0-3.0,Mn

0-2.5,Mo 0.5-2.0,Si 0-2.0,C 0.6-1.5 (UNS R30016)
CN Iron alloy, nonbase, Co 47-69,Cr 27-33,W 3.0-6.0,Fe 0-3.0,Ni 0-3.0,Mn 0-2.5,Mo 0.5-2.0,Si 0-2.0,C 0.6-1.5 (UNS R30016)
CN Manganese alloy, nonbase, Co 47-69,Cr 27-33,W 3.0-6.0,Fe 0-3.0,Ni 0-3.0,Mn 0-2.5,Mo 0.5-2.0,Si 0-2.0,C 0.6-1.5 (UNS R30016)
CN Molybdenum alloy, nonbase, Co 47-69,Cr 27-33,W 3.0-6.0,Fe 0-3.0,Ni 0-3.0,Mn 0-2.5,Mo 0.5-2.0,Si 0-2.0,C 0.6-1.5 (UNS R30016)
CN Nickel alloy, nonbase, Co 47-69,Cr 27-33,W 3.0-6.0,Fe 0-3.0,Ni 0-3.0,Mn 0-2.5,Mo 0.5-2.0,Si 0-2.0,C 0.6-1.5 (UNS R30016)
CN Silicon alloy, nonbase, Co 47-69,Cr 27-33,W 3.0-6.0,Fe 0-3.0,Ni 0-3.0,Mn 0-2.5,Mo 0.5-2.0,Si 0-2.0,C 0.6-1.5 (UNS R30016)
CN Tungsten alloy, nonbase, Co 47-69,Cr 27-33,W 3.0-6.0,Fe 0-3.0,Ni 0-3.0,Mn 0-2.5,Mo 0.5-2.0,Si 0-2.0,C 0.6-1.5 (UNS R30016)

OTHER NAMES:
CN 6B
CN AMS 5894
CN Haynes 6B
CN Haynes Stellite 6B
CN HS6B
CN R30016
CN S 6B
CN Stellite 6B
CN UNS R30016
DR 12743-58-7
MF C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI AYS
SR CA
LC STN Files: CA, CAPLUS, PROMT, USPAT2, USPATFULL
DT.CA CAplus document type: Conference; Journal; Patent; Report
RL.P Roles from patents: BIOL (Biological study); PROC (Process); PRP (Properties); USES (Uses)
RL.NP Roles from non-patents: MSC (Miscellaneous); PROC (Process); PRP (Properties); RACT (Reactant or reagent); USES (Uses); NORL (No role in record)

Component	Component Percent	Component Registry Number
Co	47 - 69	7440-48-4
Cr	27 - 33	7440-47-3
W	3.0 - 6.0	7440-33-7
Fe	0 - 3.0	7439-89-6
Ni	0 - 3.0	7440-02-0
Mn	0 - 2.5	7439-96-5
Mo	0.5 - 2.0	7439-98-7
Si	0 - 2.0	7440-21-3
C	0.6 - 1.5	7440-44-0

130 REFERENCES IN FILE CA (1907 TO DATE)
131 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 140:427404 CA
TI Experimental investigation of high temperature wear resistant coatings for industrial gas turbine
AU Matsuoka, Hideyuki; Shinohara, Nobuo; Sugita, Yuji; Ichikawa, Kunihiro; Arikawa, Hideyuki; Nishi, Kazuya
CS Electric Power Research & Development Center, Chubu Electric Power Co., Inc., Midori-ku, Nagoya-shi, Aichi-ken, 459-8522, Japan
SO ASME Turbo Expo: Power for Land, Sea & Air, Atlanta, GA, United States, June 16-19, 2003 (2003), 1188-1192 Publisher: American Society of Mechanical Engineers, New York, N. Y.
CODEN: 69ERFB; ISBN: 0-7918-3671-1

DT Conference; (computer optical disk)
LA English
CC 57-2 (Ceramics)
Section cross-reference(s): 56

AB In the contact section of industrial gas turbine parts, wear can be observed after normal operations. Especially, in the contact area of combustors and their fittings, such as a transition piece and a seal plate, the severe wear may occur owing to combustion vibration under high temperature If such severe wear occurs, repair of the combustor parts may be needed. Short cycles of inspection and repair will decrease the performance of the gas turbine. Though combustors and their fittings are subjected to high-temperature conditions without any lubricant, any relevant prevention has not been developed yet. In this paper, wear resistance of ceramic hard coating materials, i.e., titanium nitride (TiN), titanium aluminum nitride (TiAlN), chromium nitride (CrN), titanium carbide (TiC), silicon carbide (SiC), aluminum oxide (Al2O3) against various metals was tested under conditions similar to that found in gas turbines. These coatings were deposited by phys. vapor deposition (PVD) or chemical vapor deposition (CVD) processes. It was concluded that, the combination of Al2O3 coating and stellite #6B had excellent high temperature wear resistance.

ST ceramic coating wear resistance cobalt alloy substrate turbine environment ; titanium nitride coating wear resistance cobalt alloy turbine environment; aluminum titanium nitride coating wear resistance cobalt alloy turbine; chromium nitride coating wear resistance cobalt alloy turbine environment; silicon carbide coating wear resistance cobalt alloy turbine environment; alumina coating wear resistance cobalt alloy substrate turbine environment

IT Coating materials
(abrasion-resistant, ceramic; high-temperature oxidation and wear resistance of ceramic coatings on cobalt alloy substrates)

IT Oxidation
(high-temperature oxidation and wear resistance of ceramic coatings on cobalt alloy substrates in gas turbine environment)

IT 409-21-2, Silicon carbide (SiC), processes 1344-28-1, Aluminum oxide (Al2O3), processes 12070-08-5, Titanium carbide (TiC) 24094-93-7, Chromium nitride (CrN)
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(coating; high-temperature oxidation and wear resistance of ceramic coatings on cobalt alloy substrates)

IT 25583-20-4, Titanium nitride (TiN) 106389-69-9, Aluminum Titanium nitride altin
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(coating; high-temperature oxidation and wear resistance of ceramic coatings on cobalt alloy substrates in gas turbine environment)

IT 12671-96-4, Stellite #6B
RL: NUU (Other use, unclassified); USES (Uses)
(counterface; high-temperature oxidation and wear resistance of ceramic coatings on cobalt alloy substrates)

IT 12605-92-4, Hs-25
RL: NUU (Other use, unclassified); USES (Uses)
(substrate and counterface; high-temperature oxidation and wear resistance of ceramic coatings on cobalt alloy substrates)

RE.CNT 11 THERE ARE 11 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Adachi, K; Transactions of the Japan Society of Mechanical Engineers (C) 1995, V61, P2553
(2) Adachi, K; Transactions of the Japan Society of Mechanical Engineers (C) 1996, V62, P1047
(3) Destefani, J; Manufacturing Engineering 2002, V129, P47
(4) Kato, K; Surface and Coatings Technology 1995, V76-77, P469 CAPLUS
(5) Malshe, A; JOM 2002, V54, P28 CAPLUS
(6) Takahashi, T; Journal of the Gas Turbine Society of Japan 2001, V29, P338
(7) Umehara, N; Transactions of the Japan Society of Mechanical Engineers (C) 1997, V63, P1336 CAPLUS
(8) Wilson, S; Advances in Industrial Materials 1998, P373 CAPLUS
(9) Wilson, S; Surface and Coatings Technology 1996, V86-87, P75 CAPLUS
(10) Wilson, S; Surface and Coatings Technology 1997, V94-95, P53 CAPLUS
(11) Yasuoka, M; Proceeding of the 1st International Conference on Tribology in Manufacturing Process '97 1997, P306

REFERENCE 2

AN 139:170497 CA
TI SNS target tests at the LANSCE-WNR in 2001 - Part II
AU Hunn, J. D.; Riemer, B. W.; Tsai, C. C.
CS Oak Ridge National Laboratory, Oak Ridge, TN, 37831-6138, USA
SO Journal of Nuclear Materials (2003), 318, 102-108
CODEN: JNUMAM; ISSN: 0022-3115
PB Elsevier Science B.V.
DT Journal
LA English
CC 71-6 (Nuclear Technology)
Section cross-reference(s): 55, 56
AB Stopping of an 800 MeV p pulse in liquid Hg, such as in the United States Spallation Neutron Source (SNS), leads to cavitation that can affect the Hg vessel. This paper discusses pitting that was observed on Hg container walls after 100-200 p pulses obtained at the Los Alamos Neutron Science Center Weapons Neutron Research facility (LANSCE-WNR). The degree of cavitation-induced pitting was dependent on the geometry and composition of the container. As expected, very hard surfaces were particularly effective for resisting deformation from cavity collapse.
ST spallation neutron source target container cavitation pitting corrosion
IT Corrosion
(pitting; spallation neutron generators target tests at the LANSCE-WNR)
IT Cavitation
Neutron generators
(spallation neutron generators target tests at the LANSCE-WNR)
IT 12671-96-4, Stellite-6B 39418-85-4, 316LN 59071-77-1, Nitronic-60
RL: PRP (Properties)
(spallation neutron generators target tests at the LANSCE-WNR)
RE.CNT 2 THERE ARE 2 CITED REFERENCES AVAILABLE FOR THIS RECORD
(1) Philipp, A; J Fluid Mech 1998, V361, P75 CAPLUS
(2) Riemer, B; These Proceedings, dio:10.1016/S0022-3115(03)00076-X

REFERENCE 3

AN 137:173141 CA
TI An analysis of stress waves in 12Cr steel, Stellite 6B and TiN by liquid impact loading
AU Lee, Min-Ku; Kim, Whung-Whoe; Rhee, Chang-Kyu; Lee, Won-Jong
CS Advanced Nuclear Materials Department, Korea Atomic Energy Research Institute, Taejon, 305-353, S. Korea
SO Nuclear Engineering and Design (2002), 214(3), 183-193
CODEN: NEDEAU; ISSN: 0029-5493
PB Elsevier Science B.V.
DT Journal
LA English
CC 56-12 (Nonferrous Metals and Alloys)

AB This research placed emphasis on the computer simulated stress distribution on the surface and in the bulk of the materials which are subjected to the water impact causing erosion damage. The erosion damage was predicted by evaluating the spatial and temporal stress wave distribution generated by water impact pressure on 12Cr steel and Stellite 6B as steam turbine materials and TiN as a hard coating material. There were two distinctive stress wave behaviors. Firstly, the large tensile stress at the surface was developed by the Rayleigh wave component which appeared between the water drop and the Rayleigh wave front. After the Rayleigh wave detached from the water drop, the materials were in the tensile stress state which could be related to fracture initiation. Secondly, the largest tensile stress in the bulk was near the surface due to the Rayleigh wave generated at the surface and decreased due to the enlargement of wave front as the radial distance increased. Rayleigh wave's shape was broadened due to the difference between the contact point velocity and the wave front velocity, while its value decayed exponentially in the depth direction. Also, there may be a tendency to produce a circumferential crack by σrr near the surface and a lateral crack by σzz in the sub-surface. The tensile stresses in TiN were much lower than those in 12Cr steel and Stellite 6B due to its higher wave velocity.

ST stress wave chromium steel Stellite titanium nitride impact loading; hard coating crack initiation titanium nitride steel Stellite stress

IT Hardfacing
Microcrack
Tension
(anal. of stress waves in 12Cr steel, Stellite 6B and TiN by liquid impact loading)

IT Corrosion
Erosion (wear)
(erosion-corrosion; anal. of stress waves in 12Cr steel, Stellite 6B and TiN by liquid impact loading)

IT Turbines
(steam; anal. of stress waves in 12Cr steel, Stellite 6B and TiN by liquid impact loading)

IT Wave
(stress; anal. of stress waves in 12Cr steel, Stellite 6B and TiN by liquid impact loading)

IT 12671-96-4, Stellite 6B 25583-20-4, Titanium nitride (TiN) 63498-70-4, 12Cr
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(anal. of stress waves in 12Cr steel, Stellite 6B and TiN by liquid impact loading)

RE.CNT 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Adler, W; J Mater Sci 1977, V12, P1253 CAPLUS
(2) Astm; Designation G73-82, Standard practice for liquid impingement erosion testing 1987, P267
(3) Behrendt, A; Proceedings of 4th International Conference on Rain Eros and Ass Phen 1974, P425
(4) Blowers, R; J Inst Maths Applics 1969, V5, P167
(5) Bowden, F; Proc R Soc Lond Ser A 1961, V263, P433
(6) Bowden, F; Proc R Soc Lond Ser A 1965, V282, P331
(7) Brunton, J; Proceedings of 9th International Conference on High-Speed Photogr, SMPTE 1970, P444
(8) Cook, S; Proc R Soc Lond Ser A 1928, V119, P481
(9) Evans, A; J Appl Phys 1980, V51, P2473 CAPLUS
(10) Hand, R; J Appl Phys 1991, V70, P7111 CAPLUS
(11) Hand, R; Ph D Thesis, Cavendish Labs, University of Cambridge 1987
(12) Heymann, F; J Appl Phys 1969, V40, P5113
(13) Jenkins, D; In Aerodynamic Capture Particles 1960, P97
(14) Kim, H; An analysis of stress wave propagation in an elastic half space to impacts load 1996, CM-073/96, P36
(15) Lesser, M; Ann Rev Fluid Mech 1983, V15, P97

(16) Lesser, M; Proc R Soc Lond Series A 1981, V377, P289
(17) Obara, T; Wear 1995, V186, P388
(18) Rieger, H; Proceedings of third International Conference on Rain Eros and Ass Phen 1970, P147
(19) Seward, C; Studies of rain erosion mechanisms in a range of IR transmitting Ceramics-Including coated samples 1994, SPC-92-4032, P84

REFERENCE 4

AN 137:66499 CA
TI Erosion resistance of Ti-Ni shape-memory alloy to hot water jet
AU Niu, L. B.; Sakuma, T.; Takaku, H.; Kyougoku, H.; Sakai, Y.
CS Faculty of Engineering, Shinshu University, Nagano City, 380-8553, Japan
SO Materials Science Forum (2002), 394-395(Shape Memory Materials and Its Applications), 353-356
CODEN: MSFOEP; ISSN: 0255-5476
PB Trans Tech Publications Ltd.
DT Journal
LA English
CC 56-10 (Nonferrous Metals and Alloys)
AB The development of the Co-free materials with high erosion resistance is anticipated for the equipment parts in power plants. The erosion resistance against the impact of hot water jets onto the specimen surface was exptl. investigated for the Ti-Ni shape memory alloys (SMA), as compared with that of an existing Co-based alloy (Stellite). In total, the erosion resistance of Ti-Ni SMAs is superior to that of Stellite. The essential erosion-damage mechanism of Ti-Ni SMAs is the cavitation, and that of Sellite is the combination of the shearing stress and the cavitation. It is suggested that the Ti-Ni SMA will be the promising alternative materials of Stellite.
ST erosion resistance nickel titanium shape memory alloy water jet
IT Cavitation
Martensitic structure
Martensitic transformation
Shape memory effect
Surface structure
(erosion resistance of Ti-Ni shape-memory alloy to hot water jet)
IT Shape memory alloys
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(erosion resistance of Ti-Ni shape-memory alloy to hot water jet)
IT Erosion (wear)
(resistance; erosion resistance of Ti-Ni shape-memory alloy to hot water jet)
IT 11110-85-3, Nickel 50, titanium 50 (atomic) 51879-83-5, Nickel 51, titanium 49 (atomic)
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(erosion resistance of Ti-Ni shape-memory alloy to hot water jet)
IT 12671-96-4, Stellite 6B
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(erosion resistance of Ti-Ni shape-memory alloy to hot water jet in relation to)
IT 7732-18-5, Water, processes
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); PROC (Process)
(erosion resistance of Ti-Ni shape-memory alloy to hot water jet in relation to)
RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD
(1) Iwata, U; Proc JSME-ASME Inter Conf on Power Engineering-93 1993, V1, P77
(2) Nakano, E; Trans Japan Soc Mech Eng 1998, V64A, P2555
(3) Oshida, Y; Corrosion Engineering 1990, V40, P1009
(4) Rush, D; Power 1993, V135-1, P30

REFERENCE 5

AN 136:56875 CA

TI Thermodynamic stability calculations in predicting corrosion behaviour at elevated temperature

AU Skrifvars, B. O.; Backman, R.

CS Process Chemistry Group, Abo Akademi University, Turku, FI-20500, Finland

SO Materials Science Forum (2001), 369-372(Pt. 2, High Temperature Corrosion and Protection of Materials, Volume 5, Part 2), 923-930
CODEN: MSFOEP; ISSN: 0255-5476

PB Trans Tech Publications Ltd.

DT Journal

LA English

CC 55-10 (Ferrous Metals and Alloys)
Section cross-reference(s): 68, 69

AB Multi-component, multi-phase equilibrium anal. was used to determine when corrosion attack may occur and when an alloy may be resistant to corrosion at elevated temps. Although chemical equilibrium anal. does not consider processes governed by mass transport (diffusion) or other kinetic constraints, it provides a useful way to study the potential for corrosion in different gas environments. Comparison of chemical equilibrium calcns. with the results of SEM investigations shows that equilibrium calcns. usefully characterize the corrosion resistance of metals and alloys. Some examples are given and, in the case of AISI 310 and Alloy 6B in a gasification environment, the agreement with practical experience is good. For corrosion in Diesel engines, calcns. indicate that some risk for carburization or metal dusting exists with the alloy 13CrMo44. For the alloy Nimonic 80A, calcns. indicate the presence of chromium oxides and aluminum oxides, and thus reduced corrosion risk.

ST stainless steel high temp corrosion thermodn stability; steel high temp corrosion thermodn stability; nickel superalloy high temp corrosion thermodn stability; cobalt superalloy high temp corrosion thermodn stability

IT Coal gasification
Diesel engines
(corrosion in; thermodn. stability calcns. in predicting corrosion properties of steels and superalloys at elevated temperature)

IT Scale (deposits)
(oxide, composition of; thermodn. stability calcns. in predicting corrosion properties of steels and superalloys at elevated temperature)

IT Corrosion
Phase equilibrium
(thermodn. stability calcns. in predicting corrosion properties of steels and superalloys at elevated temperature)

IT Superalloys
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(thermodn. stability calcns. in predicting corrosion properties of steels and superalloys at elevated temperature)

IT 1308-38-9, Chromia, processes 1314-23-4, Zirconia, processes 1344-28-1, Alumina, processes 12068-49-4, Aluminum iron oxide Al2FeO4 12068-77-8, Chromium iron oxide Cr2FeO4
RL: CPS (Chemical process); FMU (Formation, unclassified); PEP (Physical, engineering or chemical process); PRP (Properties); FORM (Formation, nonpreparative); PROC (Process)
(oxide scale component; thermodn. stability calcns. in predicting corrosion properties of steels and superalloys at elevated temperature)

IT 11068-71-6, Nimonic 80A 11109-50-5, Aisi 304 12597-69-2, Steel, processes 12671-96-4 12725-29-0, Aisi 310 39380-93-3, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical

process); PRP (Properties); PROC (Process)
(thermodn. stability calcns. in predicting corrosion properties of steels and superalloys at elevated temperature)

RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Anon; ChemSage Handbook Ver 3-0-1 GTT-Technologies 1994
(2) Bakker, W; Materials Science Forum 1997, V251-254, P575 CAPLUS
(3) Chou, S; Proc Symp Stationary Combust 1985, V1, P19/1
(4) Chu, H; Corrosion Science 1993, V35(5-8), P1091 CAPLUS
(5) Lai, G; High-Temperature Corrosion of Enginering Alloys 1990, P66
(6) McNallan, M; Materials Performance 1994, V33, P54 CAPLUS
(7) Roine, A; HSC Chemistry for Windows, Outokumpu Research

REFERENCE 6

AN 135:306926 CA
TI Plasma duplex treatment of Stellite
AU Pfohl, C.; Rie, K.-T.
CS Institut fur Oberflachentechnik und Plasmatechnische Werkstoffentwicklung, TU Braunschweig, Germany
SO Surface and Coatings Technology (2001), 142-144, 1116-1120
CODEN: SCTEEJ; ISSN: 0257-8972
PB Elsevier Science S.A.
DT Journal
LA English
CC 56-6 (Nonferrous Metals and Alloys)
AB Despite their excellent tribol. properties, the lifetime of Stellites in some applications in metallurgical and mech. engineering is not sufficient. The development of a duplex treatment for Stellite 6B, plasma nitriding (PN) or plasma nitrocarburizing (PNC), followed by the deposition of B-containing hard coatings (TiBN or TiB2) is described. The effect of the process parameters and the gas composition was studied. Compositional and structural anal. was performed by profilometry, XRD, SEM, wave length dispersive spectroscopy and glow discharge optical spectroscopy. Knoop hardness measurements, scratch tests, pin-on-disk tests and wear tests by ball cratering were determined to describe the mech. properties. Plasma duplex treatment combines the advantages of both sep. process steps. Case hardening during diffusion treatment offers a mech. support to the coating, which exhibits a lower coefficient of friction than the diffusion-treated surface. The optimal combination consists of PNC, at high plasma energy, and a B rich TiBN coating.
ST Stellite plasma duplex treatment adhesion; nitriding boride coating Stellite adhesion; nitrocarburizing boride coating Stellite adhesion
IT Adhesion, physical
(of plasma duplex treated Stellite)
IT Carbonitriding
Nitriding
(plasma duplex treatment of Stellite)
IT 12671-96-4, Stellite 6B
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(plasma duplex treatment of)
IT 12045-63-5P, Titanium boride (TiB2) 91914-87-3P, Titanium boride nitride (TiBN)
RL: PNU (Preparation, unclassified); PRP (Properties); PREP (Preparation)
(plasma duplex treatment of Stellite)

RE.CNT 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Anon; High Temperature Materials 1948
(2) Anon; Metallographie 1969
(3) Batelle Memorial Institute Centre d'Information Du Cobalt; Cobalt Monograph 1960
(4) Bethge, R; Proc Tribologie -Fachtagung Reibung, Schmierung, Verschleiss 1999
(5) Cooper, D; J Phys D Appl Phys 1992, V25, PA195 CAPLUS
(6) Dietz, T; Mat-wiss U Werkstofftech 1993, V24, P86 CAPLUS

(7) Kim, Y; Surf Coat Technol 1995, V74-75, P425 CAPLUS
(8) Park, J; Surf Coat Technol 1998, V98, P1329 CAPLUS
(9) Pfohl, C; Mat- wiss u Werk-stoff-tech 1998, V29, P51 CAPLUS
(10) Pfohl, C; Surf Coat Technol 1999, V116-119, P911 CAPLUS
(11) Pfohl, C; Surf Coat Technol, to be published 1999
(12) Pierson, H; Mater Manuf Processes 1993, V8(4, 5), P519
(13) Stauffer, W; Metal Progress 1956, V69(1), P102
(14) Uhlig, H; The Corrosion Handbook 1948

REFERENCE 7

AN 135:8703 CA
TI Modeling solid-particle erosion in high-temperature superalloys
AU Rohatgi, A.; Strutt, A. J.; Vecchio, K. S.
CS Department of Mechanical and Aerospace Engineering, University of California, San Diego, CA, 92093-0411, USA
SO Fundamental Issues and Applications of Shock-Wave and High-Strain-Rate Phenomena, Proceedings of the International Conference on Fundamental Issues and Applications of Shock-Wave and High-Strain-Rate Phenomena, (EXPLOMET '2000), Albuquerque, NM, United States, June 19-23, 2000 (2001), Meeting Date 2000, 539-546. Editor(s): Staudhammer, Karl P.; Murr, Lawrence E.; Meyers, Marc A. Publisher: Elsevier Science Ltd., Oxford, UK. CODEN: 69BFIV
DT Conference
LA English
CC 56-12 (Nonferrous Metals and Alloys)
AB The phenomenon of solid-particle erosion of materials is equivalent to high-speed impact with the impacted surface being deformed at strain rates .apprx.103 to 106/s. However, researchers have typically used the quasi-static strength of the materials to analyze or model their erosion behavior. While this approach may be appropriate for strain rate-insensitive materials, the mech. properties need to be determined at high strain rate when modeling the erosion behavior of strain rate-sensitive materials. The erosion behavior and mech. properties of several Ni, Co, and Fe wrought superalloys were analyzed. It was previously suggested that the erosion rate of a material is proportional to the ratio of the energy expended in plastic deformation (of the eroded surface) and its fracture energy. Since tensile toughness of a material represents the energy required for its fracture, high strain-rate (.apprx.103/s) tensile toughness of the test materials was determined at various elevated temps. The coefficient of restitution of several materials was determined as a function of the particle size, impact kinetic energy and target test temperature The measured values of tensile toughness and the coefficient of restitution are compared to the values used in a recent erosion model.
ST solid particle erosion nickel superalloy modeling; copper superalloy solid particle erosion modeling; iron superalloy solid particle erosion modeling
IT Erosion (wear)
Plastic deformation
(modeling solid-particle erosion in high-temperature superalloys)
IT Simulation and Modeling, physicochemical
(solid-particle erosion in high-temperature superalloys)
IT Toughness
(tensile; modeling solid-particle erosion in high-temperature superalloys)
IT 11134-23-9, AISI 316L 12671-96-4, Haynes 6B 12682-01-8, Inconel 625 94076-32-1, Haynes 230 98686-65-8, Hastelloy C22 157451-42-8, Alloy B3
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(modeling solid-particle erosion in high-temperature)
RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD
(1) Bellman, R; Wear 1981, V70, P1 CAPLUS
(2) Donachie, M; Superalloys Source Book 1984, P3
(3) Finnie, I; J Mater 1967, V12, P682
(4) Gladys, N; Surface and Coatings Technology 1999, V120-121, P145 CAPLUS

(5) Hawke, R; IEEE Transactions on Magnetics 1995, V31, P725
(6) Hutchings, I; Wear 1981, V70, P269 CAPLUS
(7) Johnson, K; Contact Mechanics 1985, P363
(8) Lankov, A; Trenie i Iznos (Russian) 1992, V25, P206
(9) Levin, B; Metallurgical and Materials Transactions A 1999, V30A, P1763 CAPLUS
(10) Levy, A; Solid Particle Erosion and Erosion-Corrosion of Materials 1995, P69
(11) Shanov, V; Surface and Coatings Technology 1997, V94-95, P64 CAPLUS
(12) Stringer, J; Wear 1995, V186-187, P11 CAPLUS
(13) Sundararajan, G; Wear 1983, V84, P237

REFERENCE 8

AN 134:211145 CA
TI A study on the characteristics of TiN film deposited using reactive magnetron sputter ion plating
AU Lee, M. K.; Kim, W. W.; Kim, S. J.; Lee, C. K.; Kim, Y. S.
CS Korea Atomic Energy Research Institute, Taejon, 305-353, S. Korea
SO Han'guk Pyomyon Konghak Hoechi (2000), 33(2), 115-125
CODEN: HPKHEL; ISSN: 1225-8024
PB Korean Institute of Surface Engineering
DT Journal
LA Korean
CC 56-6 (Nonferrous Metals and Alloys)
Section cross-reference(s): 57
AB TiN films were deposited onto Stellite 6B alloy (Co base) by the reactive magnetron sputter ion plating. As the bias increases, TiN film changes from columnar structure to dense structure with great hardness and smooth surface due to densification and resputtering by ion bombardment. The content of oxygen and carbon impurities in the TiN film decreases greatly when the substrate bias is applied. The preferred orientation of the TiN films changes from (200) to (111) with decreasing N2/Ar ratio, and from (200) to (111) and then (220) with increasing substrate bias. The change of the preferred orientation is discussed in terms of surface energy and strain energy which are related to the impurity contents and the ion bombardment damage. The hardness of the TiN film increases with increasing compressive stress generated in the film by virtue of ion bombardment. It becomes as high as up to 3500 kgf/mm2 when an appropriate substrate bias is applied.
ST titanium nitride reactive sputter deposition cobalt alloy hardness
IT Reactive sputtering
(deposition; preferred orientation and hardness of TiN film deposited using reactive magnetron sputter ion plating on cobalt alloy)
IT Crystal orientation
Hardness (mechanical)
(preferred orientation and hardness of TiN film deposited using reactive magnetron sputter ion plating on cobalt alloy)
IT Stress, mechanical
(residual, compressive, hardness from; preferred orientation and hardness of TiN film deposited using reactive magnetron sputter ion plating on cobalt alloy)
IT 12671-96-4, Stellite 6B 25583-20-4, Titanium nitride tin
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(preferred orientation and hardness of TiN film deposited using reactive magnetron sputter ion plating on cobalt alloy)

REFERENCE 9

AN 134:58374 CA
TI Expansion valve and refrigerating system
IN Watanabe, Kazuhiko; Yano, Masamichi
PA Fujikoki Mfg. Co., Ltd., Japan

SO U.S., 14 pp.
CODEN: USXXAM
DT Patent
LA English
IC ICM F16K031-00
ICS G05D027-00
NCL 251363000
CC 47-4 (Apparatus and Plant Equipment)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	US 6164624	A	20001226	US 1995-554718	19951107
	US 6397628	B1	20020604	US 2000-543706	20000405
	US 2002008150	A1	20020124	US 2001-964447	20010928

PRAI JP 1995-82177 19950407
JP 1995-170625 19950706
US 1995-554718 19951107
US 2000-543706 20000405

AB An expansion valve comprises an orifice formed in a valve body and a valve member fixed to a movable member. Movement of a diaphragm is transmitted to an actuating rod via a member and the actuating rod actuated the movable member to control the opening amount of the path between the valve member and the orifice. An orifice member affixed to the orifice is made of a material harder than the valve body, and free from erosion or other damage by a refrigerant, which will otherwise occur at the valve opening portion.

ST refrigerating system expansion valve
IT Refrigerants
Refrigerating apparatus
Valves
(expansion valve and refrigerating system)
IT Hydrocarbons, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(halo; expansion valve and refrigerating system)
IT 11114-34-4 12597-68-1, Stainless steel, uses 12597-71-6, Brass, uses
12671-96-4 37323-75-4
RL: DEV (Device component use); USES (Uses)
(expansion valve and refrigerating system)
RE.CNT 22 THERE ARE 22 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Allen; US 2514532 1950
(2) Anon; GB 2096279 1982
(3) Anon; EP 0195993 1986
(4) Anon; Engineered Materials Handbook 1995
(5) Boltz; Handbook of Tables for Applied Engineering Science, 2nd Ed 1973
(6) Campbell; US 2478040 1949
(7) Chorkey; US 4834337 1989
(8) Dube; US 2250362 1941
(9) Heffner; US 5232015 1993
(10) Heymann, F; American Society for Testing and Materials 1970, P212
(11) Hilger; US 2141715 1938
(12) Kitamura; US 5301520 1994
(13) McGraw, H; Materials Handbook 12th Ed 1979, P930
(14) Oberhuber; US 1679779 1928
(15) Palmer; US 4815698 1989
(16) Platon; US 2471448 1949
(17) Robinson; US 3767164 1973
(18) Robinson; US 3863889 1975
(19) Shrode; US 1512243 1924
(20) Shrode; US 1578179 1926
(21) Thiel; US 4762733 1988
(22) Vadasz; US 4513778 1985

REFERENCE 10

AN 133:287916 CA
TI Corrosion/erosion resistance of Ultimet R31233 in a simulated feed for a radioactive vitrification facility
AU Imrich, Kenneth J.; Sides, Brian K.; Gee, James T.
CS Westinghouse Savannah River Company, Aiken, SC, 29808, USA
SO Ceramic Transactions (2000), 107(Environmental Issues and Waste Management Technologies in the Ceramic and Nuclear Industries V), 381-387
CODEN: CETREW; ISSN: 1042-1122
PB American Ceramic Society
DT Journal
LA English
CC 71-11 (Nuclear Technology)
Section cross-reference(s): 55, 57
AB Corrosion, erosion, and corrosion/erosion tests were performed to evaluate the performance of nickel- and cobalt-based alloys in a simulated sludge/borosilicate frit slurry representative of the feed preparation system for a radioactive waste vitrification facility. Alloys tested included Type 304L stainless steel, Hastelloy C-276, Stellite 6B, and Ultimet. Testing indicated that Ultimet had improved wear resistance and similar corrosion resistance compared to Hastelloy C-276 in the simulated sludge/frit environment.
ST high level waste vitrification equipment alloy corrosion erosion resistance
IT Frits
(borosilicate; corrosion/erosion resistance of Ultimet R31233 and other alloys in a simulated feed for a high-level radioactive waste vitrification facility)
IT Vitrification
(corrosion/erosion resistance of Ultimet R31233 and other alloys in a simulated feed for a high-level radioactive waste vitrification facility)
IT High-level radioactive wastes
(sludges; corrosion/erosion resistance of Ultimet R31233 and other alloys in a simulated feed for a high-level radioactive waste vitrification facility)
IT 12604-59-0, Hastelloy C-276 12611-86-8 12671-96-4, Stellite 6B
139658-36-9, Ultimet
RL: DEV (Device component use); TEM (Technical or engineered material use); USES (Uses)
(corrosion/erosion resistance of Ultimet R31233 and other alloys in a simulated feed for a high-level radioactive waste vitrification facility)
RE.CNT 4 THERE ARE 4 CITED REFERENCES AVAILABLE FOR THIS RECORD
(1) Crook, P; ASM Handbook 1995, V18
(2) Crook, P; Advanced Materials & Processes 1994
(3) Nava, J; corrosion Science 1993, V35(5-8) CAPLUS
(4) Woodford, D; Metall Trans 1972, V3 CAPLUS

L9 ANSWER 19 OF 20 REGISTRY COPYRIGHT 2005 ACS on STN
RN 11105-36-5 REGISTRY
ED Entered STN: 16 Nov 1984
CN Cobalt alloy, base, Co 50-65,Cr 26-32,W 7-9.5,Fe 0-3,Ni 0-3,Si 0.4-2,C 1.2-1.7,Mn 0-1,Mo 0-1 (UNS R30012) (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Carbon alloy, nonbase, Co 50-65,Cr 26-32,W 7-9.5,Fe 0-3,Ni 0-3,Si 0.4-2,C 1.2-1.7,Mn 0-1,Mo 0-1 (UNS R30012)
CN Chromium alloy, nonbase, Co 50-65,Cr 26-32,W 7-9.5,Fe 0-3,Ni 0-3,Si 0.4-2,C 1.2-1.7,Mn 0-1,Mo 0-1 (UNS R30012)
CN Iron alloy, nonbase, Co 50-65,Cr 26-32,W 7-9.5,Fe 0-3,Ni 0-3,Si 0.4-2,C 1.2-1.7,Mn 0-1,Mo 0-1 (UNS R30012)
CN Manganese alloy, nonbase, Co 50-65,Cr 26-32,W 7-9.5,Fe 0-3,Ni 0-3,Si 0.4-2,C 1.2-1.7,Mn 0-1,Mo 0-1 (UNS R30012)
CN Molybdenum alloy, nonbase, Co 50-65,Cr 26-32,W 7-9.5,Fe 0-3,Ni 0-3,Si 0.4-2,C 1.2-1.7,Mn 0-1,Mo 0-1 (UNS R30012)

CN   Nickel alloy, nonbase, Co 50-65,Cr 26-32,W 7-9.5,Fe 0-3,Ni 0-3,Si 0.4-2,C 1.2-1.7,Mn 0-1,Mo 0-1 (UNS R30012)
CN   Silicon alloy, nonbase, Co 50-65,Cr 26-32,W 7-9.5,Fe 0-3,Ni 0-3,Si 0.4-2,C 1.2-1.7,Mn 0-1,Mo 0-1 (UNS R30012)
CN   Tungsten alloy, nonbase, Co 50-65,Cr 26-32,W 7-9.5,Fe 0-3,Ni 0-3,Si 0.4-2,C 1.2-1.7,Mn 0-1,Mo 0-1 (UNS R30012)
OTHER NAMES:
CN   Alloy 12
CN   ASME SFA5.21-ERCoCr-B
CN   AWS A5.21-ERCoCr-B
CN   CoCr30W8
CN   ERCoCr-B
CN   Haynes 12
CN   Haynes Stellite 12
CN   HST-12
CN   KC 29 W
CN   R30012
CN   RCoCr-B
CN   SAE J775-VF7
CN   SAE VF7
CN   Soudostel 12
CN   Stellite 12
CN   Stellite WR12
CN   UNS R30012
CN   VF7
CN   Virium 12
CN   X140CoCrW 56 30 8
DR   12631-62-8, 62412-99-1, 85132-16-7
MF   C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI   AYS
LC   STN Files: CA, CAPLUS, CIN, USPATFULL
DT.CA CAplus document type: Conference; Journal; Patent; Report
RL.P   Roles from patents: PREP (Preparation); PROC (Process); PRP (Properties); USES (Uses)
RL.NP Roles from non-patents: PREP (Preparation); PROC (Process); PRP (Properties); RACT (Reactant or reagent); USES (Uses); NORL (No role in record)

Component	Component Percent	Component Registry Number
Co	50 - 65	7440-48-4
Cr	26 - 32	7440-47-3
W	7 - 9.5	7440-33-7
Fe	0 - 3	7439-89-6
Ni	0 - 3	7440-02-0
Si	0.4 - 2	7440-21-3
C	1.2 - 1.7	7440-44-0
Mn	0 - 1	7439-96-5
Mo	0 - 1	7439-98-7

112 REFERENCES IN FILE CA (1907 TO DATE)
112 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN   141:193639 CA
TI   Development of 3D functionally graded models by laser-assisted coaxial powder injection
AU   Yakovlev, Artem; Bertrand, Ph.; Smurov, Igor Y.
CS   Ecole Nationale d'Ingenieurs de Saint-Etienne, Saint Etienne, 42023, Fr.
SO   Proceedings of SPIE-The International Society for Optical Engineering (2004), 5399(Laser-Assisted Micro- and Nanotechnologies 2003), 220-227
     CODEN: PSISDG; ISSN: 0277-786X

PB SPIE-The International Society for Optical Engineering
DT Journal
LA English
CC 56-4 (Nonferrous Metals and Alloys)
AB Relatively new method of producing 3D objects with Functionally Graded Material (FGM) structure is realized by coaxial powder injection with variable composition into the zone of laser beam action. The desired 3D material distribution is realized by repetitive deposition process. Theor. anal. and exptl. results show essential role of radiation mode and powder granularity as optimization parameters. Applied laser sources are continuous wave Nd:YAG(HAAS 2006D, 2kW), pulse-periodic Nd:YAG(HAAS HL304P, avg. power 300 W), quasi-cw CO2 (Rofin-Sinar, 300 W). Among applied materials are nanostructured WC/Co, CuSn, Stainless steel 316L, 430L, Co-base alloy, nanostructured FeCu, etc. The originality of obtained results is that different gradient types are produced "in situ" and combined within one sample: smooth, sharp or multilayered gradients. The number of samples is produced and examined with metallog. and SEM anal. The minimal spatial gradient resolution (transition zone between 2 different materials) is starting from 10 μ and can be varied in a wide range; the surface roughness depends from powder granularity, best value of Ra is about 5 μm, microhardness of differet zones of samples is varied from 120 to 450 HV. The achieved geometry spatial resolution is 200 μm.
ST steel cobalt copper alloy laser prototyping powder injection
IT Lasers
Microhardness
Microstructure
(development of 3D functionally graded models by laser-assisted coaxial powder injection)
IT Composites
(functionally gradient; development of 3D functionally graded models by laser-assisted coaxial powder injection)
IT Models (physical)
(prototypes; development of 3D functionally graded models by laser-assisted coaxial powder injection)
IT 12611-86-8 56589-45-8, Iron alloy, Fe 65-71,Cr 17.0-19.0,Ni 8.00-10.00,Si 2.00-3.00,Mn 0.80-1.50,W 0.80-1.20,C 0.40-0.50,P 0-0.045,S 0-0.045 (DIN 1.4873)
RL: NUU (Other use, unclassified); USES (Uses)
(development of 3D functionally graded models by laser-assisted coaxial powder injection)
IT 11105-36-5, Stellite 12 11134-23-9 51636-79-4 58817-50-8 117629-22-8, Iron alloy, Fe 80-84,Cr 16.0-18.0,Mn 0-1.0,Si 0-1.0,P 0-0.04,C 0-0.03,S 0-0.03 (JIS SUS 430L) 141559-15-1, Cobalt alloy, Co 88, WC 12
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(development of 3D functionally graded models by laser-assisted coaxial powder injection)
RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD
(1) Chen, I; Materials Science and Engineering 2001, VA317, P226 CAPLUS
(2) Ensz, M; Critical Issues For Functionally Graded Material Deposition By Laser Engineered Net Shaping (LENS)
(3) Iakovlev, A; IQEC proceedings 2002
(4) Jehnming, L; Journal of Materials Processing Technology 2000, V105, P17
(5) Jehnming, L; Optics & Laser Technology 1999, V31, P251
(6) Lin, J; Optics & Laser Technology 1998, V30, P77 CAPLUS
(7) Rajiv, A; JOM-e 2000, V52(1)
(8) Terry, W; Wohlers Report 2001 Rapid Prototyping & Tooling State of the Industry Annual Worldwide Progress Report
(9) Wu, X; Surface & Coatings technology 1996, 79, P200
(10) Wu, X; Surface and Coatings Technology 1999, V115, P111 CAPLUS

REFERENCE 2

AN 141:160593 CA
TI Activated combustion HVAF coatings for protection against wear and high temperature corrosion
AU Verstak, A.; Baranovski, V.
CS UniqueCoat Technologies, Ashland, VA, USA
SO Thermal Spray 2003: Advancing the Scienceand Applying the Technology, Proceedings of the International Thermal Spray Conference, Orlando, FL, United States, May 508, 2003 (2003), Volume 1, 535-541. Editor(s): Marple, Basil R.; Moreau, Christian. Publisher: ASM International, Materials Park, Ohio.
CODEN: 69EUUZ; ISBN: 0-87170-785-3
DT Conference
LA English
CC 56-6 (Nonferrous Metals and Alloys)
AB Activated-combustion high-velocity air-fuel (HVAF) spraying involves a jet of air-fuel combustion products to deposit coatings of metal and carbide powders. In the process, spray particles are heated to below their melting temperature while accelerated to a velocity typically 700-850 m/s to form a coating on impact with a substrate. A low oxygen content and high d. are distinguishing features of the coatings and result in their excellent performance under conditions of severe wear and corrosion. Besides a new level of coating quality, the coating process demonstrates outstanding efficiency and spray rates 5-10 times exceeding those of the high-velocity oxy-fuel counterparts. Results on the characterization of selected metal and carbide coatings are presented, and their applications are described.
ST wear resistant anticorrosive spray coating
IT Coating materials
(abrasion-resistant; activated combustion high-velocity air-fuel coatings for protection against wear and high temperature corrosion)
IT Coating materials
(anticorrosive; activated combustion high-velocity air-fuel coatings for protection against wear and high temperature corrosion)
IT Coating process
(spray; activated combustion high-velocity air-fuel coatings for protection against wear and high temperature corrosion)
IT 11105-36-5, Stellite 12 12682-01-8, Alloy 625 56273-47-3, Alloy 671 62531-60-6 112417-62-6
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(activated combustion high-velocity air-fuel coatings for protection against wear and high temperature corrosion)
RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Browning, J; Spraytime 2000, V7(4), P19
(2) Dorfman, M; Advanced Materials & Processes 2002, V160(7), P47
(3) Gilmore, D; J of Thermal Spray Technol 1999, V4(8), P576
(4) Hanson, T; J of Thermal Spray Technol 2002, V11(1), P75 CAPLUS
(5) Kreye, H; Proceedings of the 4th HVOF Colloquium 1997, P13
(6) Legoux, J; Proceedings of the International Thermal Spray Conference 2000, P479 CAPLUS
(7) Papyrin, A; Proceeding of the International Thermal Spray Conference 2002, P380
(8) Stoltenhoff, T; Proceeding of the International Thermal Spray Conference 2002, P366
(9) Verstak, A; Corrosion'99 1999, Paper No 74

REFERENCE 3

AN 141:92528 CA
TI Temperature monitoring of Nd:YAG laser cladding (CW and PP) by advanced pyrometry and CCD-camera-based diagnostic tool
AU Doubenskaia, M.; Bertrand, Ph.; Smurov, Igor Y.
CS Lab. DIPI, Ecole Nationale d'Ingenieurs de Saint-Etienne, Saint-Etienne,

42023, Fr.
SO Proceedings of SPIE-The International Society for Optical Engineering (2004), 5399(Laser-Assisted Micro- and Nanotechnologies 2003), 212-219
CODEN: PSISDG; ISSN: 0277-786X
PB SPIE-The International Society for Optical Engineering
DT Journal
LA English
CC 56-6 (Nonferrous Metals and Alloys)
AB The set of original pyrometers and the special diagnostic CCD-camera were applied for monitoring of Nd:YAG laser cladding (Pulsed-Periodic and Continuous Wave) with coaxial powder injection and online measurement of cladded layer temperature The expts. were carried out in course of elaboration of wear resistant coatings using various powder blends (WC-Co, CuSn, Mo, Stellite grade 12, etc.) applying variation of different process parameters: laser power, cladding velocity, powder feeding rate, etc. Surface temperature distribution to the cladding seam and the overall temperature mapping were registered. The CCD-camera based diagnostic tool was applied for: (i) monitoring of flux of hot particles and its instability; (ii) measurement of particle-in-flight size and velocity; (iii) monitoring of particle collision with the clad in the interaction zone.
ST laser cladding surface temp pyrometry CCD camera
IT Coating materials
(abrasion-resistant; temperature monitoring in Nd:YAG laser cladding by advanced pyrometry and CCD-camera-based diagnostic tool)
IT Velocity
(of particles; temperature monitoring in Nd:YAG laser cladding by advanced pyrometry and CCD-camera-based diagnostic tool)
IT Laser cladding
Surface temperature
(temperature monitoring in Nd:YAG laser cladding (CW and PP) by advanced pyrometry and CCD-camera-based diagnostic tool)
IT CCD cameras
Particle size distribution
Pyrometry
(temperature monitoring in Nd:YAG laser cladding by advanced pyrometry and CCD-camera-based diagnostic tool)
IT 12005-21-9, YAG
RL: DEV (Device component use); USES (Uses)
(laser, neodymium-doped; temperature monitoring in Nd:YAG laser cladding by advanced pyrometry and CCD-camera-based diagnostic tool)
IT 7439-98-7, Molybdenum, processes 11105-36-5, Stellite 12 12003-21-3
12597-70-5, Bronze 12637-51-3
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(temperature monitoring in Nd:YAG laser cladding by advanced pyrometry and CCD-camera-based diagnostic tool)
RE.CNT 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD
(1) Bertrand, P; Controle et Optimisation des Procedes Industriels Hautes Temperatures utilisant les faisceaux d'energie concentree (Laser, Plasma, Faisceau d'electrons) par pyrometrie optique 2001
(2) Bertrand, P; Proceedings of the ITSC2002 2002
(3) Coates, P; Metrologia 1981, V17, P103
(4) Daniel, N; NASA Technical Memorandum 1997, P107433
(5) Duvaut, T; Revue generale de Thermique 1996, V35, P185 CAPLUS
(6) Duvaut, T; These Universite de REIMS CHAMPAGNE-ARDENNES 1994
(7) Gebbie, H; Nature 1972, V240, P391 CAPLUS
(8) Ignatiev, M; Applied Surface Science 1996, V96-98, P505 CAPLUS
(9) Ignatiev, M; Applied Surface Science 1997, V109/110, P498 CAPLUS
(10) Ignatiev, M; High Temperature Material Processes 1997, V1, P109 CAPLUS
(11) Ignatiev, M; Journal of Measurement Science and Technology 1994, V5, P563 CAPLUS
(12) Ignatiev, M; TEMPECO'96 1997, P569
(13) Leal, C; These Universite de POITIERS 1998

(14) Quinn, T; Temperature 1983
(15) Smurov, I; CISFFEL-6 1998, P647
(16) Smurov, I; CISFFEL-6 1998, P655
(17) Smurov, I; Proceedings of the First International WLT-Conference on Lasers in Manufacturing 2001, P248
(18) Ya, S; High Temperatures-High Pressures 1972, V4, P715
(19) Ya, S; High Temperatures-High Pressures 1976, V8, P493

REFERENCE 4

AN 140:378762 CA
TI Laser cladding of wear resistant metal matrix composite coatings
AU Yakovlev, A.; Bertrand, Ph.; Smurov, I.
CS DIPI, ENISE, Saint Etienne, 42023, Fr.
SO Thin Solid Films (2004), 453-454, 133-138
CODEN: THSFAP; ISSN: 0040-6090
PB Elsevier B.V.
DT Journal
LA English
CC 56-6 (Nonferrous Metals and Alloys)
AB A number of coatings with wear-resistant properties as well as with a low friction coefficient are produced by laser cladding. The structure of these coatings is determined by required performance and realized as metal matrix composite (MMC), where solid lubricant serves as a ductile matrix (e.g. CuSn), reinforced by appropriate ceramic phase (e.g. WC/Co). One of the engineered coatings with functionally graded material (FGM) structure has a dry friction coefficient 0.12. Coatings were produced by coaxial injection of powder blend into the zone of laser beam action. Metallog. and tribol. examns. were carried out confirming the advanced performance of engineered coatings.
ST metal matrix composite wear resistant coating laser cladding
IT Coating materials
(abrasion-resistant, metal matrix composite; laser cladding preparation and properties of wear-resistant metal matrix composite coatings)
IT Friction
Laser cladding
(laser cladding preparation and properties of wear-resistant metal matrix composite coatings)
IT Metal matrix composites
(wear-resistant coatings; laser cladding preparation and properties of wear-resistant metal matrix composite coatings)
IT 117629-22-8, Aisi430l
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(composites with tungsten carbide reinforcement and CuSn solid lubricant, wear-resistant coatings; laser cladding preparation and properties of wear-resistant metal matrix composite coatings)
IT 11105-36-5, Stellite 12
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(core, wear-resistant coating component; laser cladding preparation and properties of wear-resistant metal matrix composite coatings)
IT 12667-47-9
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(reinforcement phase, composites with CuSn solid lubricant, wear-resistant coatings; laser cladding preparation and properties of wear-resistant metal matrix composite coatings)
IT 112417-62-6
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC

(Process); USES (Uses)
(reinforcement phase, composites with steel matrix and CuSn solid lubricant, wear-resistant coatings; laser cladding preparation and properties of wear-resistant metal matrix composite coatings)

IT 12675-87-5 51636-79-4
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(solid lubricant, wear-resistant coating component; laser cladding preparation and properties of wear-resistant metal matrix composite coatings)

RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Lin, J; Opt Laser Technol 1999, V31, P251 CAPLUS
(2) Lin, J; Opt Laser Technol 1999, V31, P565
(3) Man, H; Scripta Mater 2001, V44, P2801 CAPLUS
(4) Pei, Y; Acta Mater 2000, V48, P2617 CAPLUS
(5) Przybyowicz, J; J Mater Process Technol 2001, V109, P154
(6) Wu, X; Surf Coat Technol 1999, V115, P111 CAPLUS

REFERENCE 5

AN 140:132283 CA

TI Activated combustion HVAF: new development in solid particle spray technology

AU Verstak, A.; Baranovski, V.

CS UniqueCoat Technologies, Ashland, VA, USA

SO Surface Engineering: Coatings and Heat Treatments, Proceedings of the 1st ASM International Surface Engineering Congress and the 13th International Federation for Heat Treatment and Surface Engineering Congress, Columbus, OH, United States, Oct. 7-10, 2002 (2003), Meeting Date 2002, 685-689. Editor(s): Popoola, Oludele O. Publisher: ASM International, Materials Park, Ohio.
CODEN: 69DYAM; ISBN: 0-87170-781-0

DT Conference

LA English

CC 57-9 (Ceramics)
Section cross-reference(s): 55, 56

AB Activated Combustion HVAF Spraying (AC-HVAF) utilizes a jet of air and gaseous fuel combustion products to deposit coatings of metallic and carbide powders. In the jet, spray particles are heated below their melting temperature while accelerated to velocity well above 700 m/s, forming a coating upon impact with a substrate. Low oxygen content and high d. are basic advantages of the AC-HVAF coating structure. The AC-HVAF process demonstrates outstanding technol. efficiency and spray rates many folds exceeding those of the HVOF counterparts.

ST activated combustion HVAF spraying cermet alloy microstructure

IT Cermets
Combustion
Microstructure
Particle size
Spraying
(activated combustion HVAF solid particle spray technol.)

IT 7440-22-4, Silver, processes 7440-50-8, Copper, processes 11105-36-5, Stellite 12 12682-01-8, Alloy 625 56273-47-3, Alloy 671 82839-77-8
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(activated combustion HVAF solid particle spray technol.)

IT 12070-12-1, Tungsten carbide 54988-78-2 112417-62-6
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(cermet; activated combustion HVAF solid particle spray technol.)

IT 74-98-6, Propane, processes

RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(fuel; activated combustion HVAF solid particle spray technol.)

IT 7429-90-5, Aluminum, processes
RL: PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(substrate; activated combustion HVAF solid particle spray technol.)

REFERENCE 6

AN 140:62665 CA
TI Application of finite element method to plasma weld surfacing of highly stressed components
AU Matthes, K.-J.; Alaluss, K.; Semmler, U.; Haase, J.; Gebert, A.
CS Chemnitz, Germany
SO DVS-Berichte (2003), 225, 273-278
CODEN: DVSBA3; ISSN: 0418-9639
PB Verlag fuer Schweissen und Verwandte Verfahren DVS-Verlag
DT Journal
LA German
CC 55-6 (Ferrous Metals and Alloys)
AB Weld surfacing of steel (S235JR and S355JO) with wear resistant Co-base alloy Stellit 6 and 12, Ni-base alloy Ni625, and V-base alloy V12 is studied. Due to significant differences in thermo-phys. and mech. properties between base and filler materials, FEM modeling is performed for computation the weld pool geometry, residual stress distribution, and distortions of a rolling mill roller segment. Calcn. and exptl. results well agreed.
ST plasma weld surfacing steel finite element simulation
IT Weld surfacing
(finite-element simulation of plasma weld surfacing of highly stressed steel components with Co, Ni, and V alloys)
IT Simulation and Modeling, physicochemical
(finite-element; of plasma weld surfacing of highly stressed steel components with Co, Ni, and V alloys)
IT Welding of metals
(plasma-arc; finite-element simulation of plasma weld surfacing of highly stressed steel components with Co, Ni, and V alloys)
IT 11105-35-4, Stellite 6 11105-36-5, Stellite 12 12682-01-8, Ni625 58503-89-2, S235JR, processes 71497-79-5, S355JO, processes 639475-36-8, V12 (Alloy)
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(finite-element simulation of plasma weld surfacing of highly stressed steel components with Co, Ni, and V alloys)
RE.CNT 8 THERE ARE 8 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Alaluss, K; Schriftenreihe Fugetechnik/Schweitechnik 2001
(2) Anon; ANSYS User's Manuals 1998-2000
(3) Anon; Technologieentwicklung zur Beherrschung der Verzugsproblematik beim Auftragschweien langer Maschinenmesser und Verschleileisten unter Nutzung von FEM-Berechnungen 2003
(4) Esi Group; SYSWELD 2000 Manuals, http://www.esi-group.com 2000
(5) Lugscheider, E; Untersuchungen von WIG- und plasma-pulver-auftraggeschweiter Hartlegierungen fur Ventilsitzbeschichtungen 1989
(6) Radaj, D; Schweiprozesimulation:Grundlagen und Anwendungen 1992
(7) Richter, F; Stahleisen Sonderberichte 1983, 10, CAPLUS
(8) Touloukian, Y; Thermophysical Properties of Matter 1979, V14

REFERENCE 7

AN 139:368147 CA

TI Braze, braze-containing material, and process for repair of defect in metal article surface

IN Nakahashi, Masako; Yasuda, Yuji; Asai, Satoshi; Tokunaga, Takashi; Nishimoto, Kazutoshi; Saita, Kazuyuki

PA Toshiba Corp., Japan; Toshiba Engineering Co.

SO Jpn. Kokai Tokkyo Koho, 9 pp.
CODEN: JKXXAF

DT Patent

LA Japanese

IC ICM B23K035-30
ICS B23P006-00; C22C019-03

CC 56-3 (Nonferrous Metals and Alloys)
Section cross-reference(s): 57

FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	JP 2003326387	A2	20031118	JP 2002-138762	20020514
PRAI	JP 2002-138762	20020514			

AB The braze comprises a main metal which has m.p. lower than the article metal, a minor metal (a) which alloys the main metal and decreases the m.p., and a minor metal (b) which alloys the main metal or minor metal (a) and produces a precipitate with hardness higher than the main metal. The braze shows high hardness, wear resistance, and defect filling efficiency. To improve hardness and overlay thickness a hard material is added to the braze. The repair process includes applying the braze (or braze-containing material) to the defect and filling the defect with the braze by heating in inert gas atmospheric or vacuum. Optionally a wear-resistant piece is joined to the metal surface by the braze to cover the defect.

ST braze compn metal surface defect repair

IT Brazes
(brazes for repair of metal surface defects with improved hardness and overlay thickness and filling efficiency)

IT Borides
Carbides
Nitrides
RL: TEM (Technical or engineered material use); USES (Uses)
(hard material, added to brazes; brazes for repair of metal surface defects with improved hardness and overlay thickness and filling efficiency)

IT Cobalt alloy, base
Nickel alloy, base
RL: TEM (Technical or engineered material use); USES (Uses)
(hard material, added to brazes; brazes for repair of metal surface defects with improved hardness and overlay thickness and filling efficiency)

IT 7429-90-5, Aluminum, uses 7439-89-6, Iron, uses 7439-93-2, Lithium, uses 7440-21-3, Silicon, uses 7440-48-4, Cobalt, uses 7440-50-8, Copper, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(braze component; brazes for repair of metal surface defects with improved hardness and overlay thickness and filling efficiency)

IT 11122-45-5 622331-41-3 622331-42-4 622331-43-5
RL: TEM (Technical or engineered material use); USES (Uses)
(brazes; brazes for repair of metal surface defects with improved hardness and overlay thickness and filling efficiency)

IT 10043-11-5, Boron nitride (BN), uses 11105-36-5, Stellite 12 12629-02-6, Stellite 21 12667-49-1 37270-35-2, Stellite 1 51613-82-2 622331-44-6
RL: TEM (Technical or engineered material use); USES (Uses)
(hard material, added to brazes; brazes for repair of metal surface defects with improved hardness and overlay thickness and filling efficiency)

REFERENCE 8

AN 139:340204 CA
TI Use of the finite-element method in manufacture of hot forming tools by
near-net shaping weld surfacing
AU Matthes, Klaus-Juergen; Alaluss, Khaled
CS Chemnitz, Germany
SO Schweissen & Schneiden (2003), 55(8), 436-438,440,442-444
CODEN: SCSCA4; ISSN: 0036-7184
PB Verlag fuer Schweissen und Verwandte Verfahren DVS-Verlag
DT Journal
LA German
CC 55-6 (Ferrous Metals and Alloys)
AB A calcn. model for near-net-shape weld surfacing of a cross rolling
segment is introduced. At the end, the weld pool geometry, its
deformations, and its residual stresses can be calculated Weld seam defects,
lacks of fusion, and base metal accumulation can be analyzed and prevented
by heat flux d. adjustment. Well accordance between calcns. and expts.
could be shown by two examples.
ST hot forming tool weld surfacing finite element simulation; steel forming
tool abrasion resistant coating weld surfacing simulation
IT Coating materials
(abrasion-resistant; finite-element simulation in manufacture of hot forming
tools by near-net shaping weld surfacing)
IT Weld surfacing
(finite-element simulation in manufacture of hot forming tools by near-net
shaping weld surfacing)
IT Simulation and Modeling, physicochemical
(finite-element; finite-element simulation in manufacture of hot forming
tools by near-net shaping weld surfacing)
IT Tools
(forming; finite-element simulation in manufacture of hot forming tools by
near-net shaping weld surfacing)
IT Stress, mechanical
(residual; finite-element simulation in manufacture of hot forming tools by
near-net shaping weld surfacing)
IT 11105-36-5, Stellite 12
RL: DEV (Device component use); PEP (Physical, engineering or chemical
process); PYP (Physical process); PROC (Process); USES (Uses)
(coating; finite-element simulation in manufacture of hot forming tools by
near-net shaping weld surfacing)
IT 12682-01-8, Ni 625
RL: DEV (Device component use); PEP (Physical, engineering or chemical
process); PYP (Physical process); PROC (Process); USES (Uses)
(intermediate layer; finite-element simulation in manufacture of hot forming
tools by near-net shaping weld surfacing)
IT 58503-89-2, S235JR, processes
RL: DEV (Device component use); PEP (Physical, engineering or chemical
process); PYP (Physical process); PROC (Process); USES (Uses)
(tool; finite-element simulation in manufacture of hot forming tools by
near-net shaping weld surfacing)
RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD
(1) Alaluss, K; Beitrag zur Ermittlung und Beeinflussung der Verformungen und
Eigenspannungen formgebend plasma-pulverauftraggeschweiBter Bauteile
2001, V1/2001
(2) Anon; ANSYS User's Manual 1998-2002
(3) Lugscheider, E; Untersuchungen von WIG- und plasma-pulver-
auftraggeschweiBten Hartlegierungen fur Ventilsitzbeschichtungen 1989,
AIF-Bericht 6910
(4) Radaj, D; SchweiBprozesssimulation, Grundlagen und Anwendungen 1999
(5) Richter, F; Stahleisen-Sonderberichte 1983, 10, CAPLUS
(6) Touloukian, Y; Thermophysical properties of matter 1979

REFERENCE 9

AN 136:266491 CA
TI Evaluation of the characteristics and wear resistance of layers produced in a ion-nitrided Stellite alloy
AU Riofano, Rosamel M. Munoz; Casteletti, Luiz Carlos; Amoni, Eduardo Augusto B.; Nucci, Rafael
CS Escola de Engenharia de Sao Carlos, Universidade de Sao Paulo, Brazil
SO EBRATS 2000, Encontro e Exposicao Brasileira de Tratamentos de Superficie, 10th, Sao Paulo, Brazil, May 22-25, 2000 (2000), 340-347 Publisher: Associacao Brasileira de Tratamentos de Superficie, Sao Paulo, Brazil. CODEN: 69CGI5
DT Conference; (computer optical disk)
LA Portuguese
CC 56-7 (Nonferrous Metals and Alloys)
AB In the present work, the Stellite 12 alloy with the chemical composition 0.87C-0.94Mn-1.22Si-1,78Ni-31.63Cr-9.74W-3.51Fe-48.72Co was ion-nitrided and the temps., time of treatment, and frequencies of the pulse were varied to obtain the most appropriate layer. The layers were characterized by metallog. and microhardness tests, resistance to wear, and EDX probe . The treatment was effective to increase the resistance to abrasive wear. The layer was formed on the substrate, being absent of surface carbides. The ion nitrided layer consisted of chromium nitrides of the type CrN and Cr2N. The EDX anal. indicated the possibility of the carbonitrides presence in the surface.
ST cobalt alloy ion nitriding wear resistance
IT Coating materials
(abrasion-resistant; evaluation of characteristics and wear resistance of layers produced on ion-nitrided Stellite alloy)
IT Nitriding
(plasma; evaluation of characteristics and wear resistance of layers produced on ion-nitrided Stellite alloy)
IT 11105-36-5, Stellite 12
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(evaluation of characteristics and wear resistance of layers produced on ion-nitrided Stellite alloy)
IT 12053-27-9P, Chromium nitride Cr2N
RL: SPN (Synthetic preparation); PREP (Preparation)
(evaluation of characteristics and wear resistance of layers produced on ion-nitrided Stellite alloy)
IT 24094-93-7P, Chromium nitride CrN
RL: SPN (Synthetic preparation); PREP (Preparation)
(surface layer containing; evaluation of characteristics and wear resistance of layers produced on ion-nitrided Stellite alloy)
RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD
(1) Anon; Metals Handbook, 9th edition V3, P207
(2) Kim, S; Surface and Coatings Technology 1995, V74-75, P425
(3) Neville, A; Wear 1999, V233-235, P596 CAPLUS

REFERENCE 10

AN 136:203504 CA
TI Thermal fatigue characteristics of PTA hardfaced steels
AU Kang, S. H.; Shinoda, T.; Kato, Y.; Jeong, H. S.
CS Nagoya University, Nagoya, 464-8603, Japan
SO Surface Engineering (2001), 17(6), 498-504
CODEN: SUENET; ISSN: 0267-0844
PB IOM Communications Ltd.
DT Journal
LA English
CC 55-12 (Ferrous Metals and Alloys)
AB Many types of hard material are coated on the surface to improve their wear resistance. Addition of vanadium carbide to Co based alloys (stellite number 21) as a hard material powder is one of the ways to improve the wear

resistance characteristics of the surface layer. The plasma transfer arc (PTA) welding process was introduced as a coating technol. for elevated temperature surface modification. This process has recently generated interest in the surface modification field owing to its operability, low initial cost of equipment, high deposition rate, and small dilution rate. Coated layers produced by PTA considerably improve the hardness and wear resistance of surface layers for elevated temperature applications. Vanadium carbide (VC) addition into stellite powder showed a significant improvement in wear resistance. However, alloys containing VC showed pronounced sensitivity to hot cracking under repeated heating and cooling environments. This study clarifies the cause of thermal fatigue cracking in Co based alloy deposits with VC powder addns. Cracks result from the difference in thermal expansion coefficient between the matrix and the carbides. Cracks initiate in the central part of the surface region and grow in a perpendicular direction towards the surface. The tendency for thermal fatigue crack initiation seems to increase with increasing carbide volume fraction and decrease as the volume fraction of the dendritic region decreases.

ST thermal fatigue hardfaced steel welding hot crack wear

IT Microcrack
(hot; thermal fatigue characteristics of PTA hardfaced steels)

IT Welding
(plasma transfer arc; thermal fatigue characteristics of PTA hardfaced steels)

IT Cooling
Crack initiation
Hardness (mechanical)
Thermal expansion
Thermal fatigue
Wear
(thermal fatigue characteristics of PTA hardfaced steels)

IT Carbides
RL: PNU (Preparation, unclassified); PREP (Preparation)
(thermal fatigue characteristics of PTA hardfaced steels)

IT 12741-56-9, SKD61
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(thermal fatigue characteristics of PTA hardfaced steels)

IT 12070-10-9, Vanadium carbide
RL: MOA (Modifier or additive use); USES (Uses)
(thermal fatigue characteristics of PTA hardfaced steels)

IT 11105-35-4, Stellite 6 11105-36-5, Stellite 12 12629-02-6, Stellite 21 125780-51-0, Stellite 32
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); TEM (Technical or engineered material use); PROC (Process); USES (Uses)
(thermal fatigue characteristics of PTA hardfaced steels)

RE.CNT 9 THERE ARE 9 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) ASM International; Metals handbook, 10th edn 1990, V2, P446
(2) Chase, T; Report R1-R23
(3) Dieter, G; Mechanical metallurgy, 2nd edn 1976, P449
(4) Glenny, E; J Inst Met 1960, V88, P449 CAPLUS
(5) Hashimoto, T; Weld Int 1997, V11, P328
(6) Kim, H; Surf Eng 1999, V15(6), P495 CAPLUS
(7) Sasaki, K; Overlaying by plasma transferred arc welding Report IIW-Doc IX-1669-92, P23
(8) Sasaki, K; Proc 5th Thermal Spray Conf 1993, P385 CAPLUS
(9) Shinoda, T; Zvaranie Svarovani 1999, V10(48), P226

L9 ANSWER 20 OF 20 REGISTRY
RN 11105-35-4 REGISTRY
ED Entered STN: 16 Nov 1984
CN Cobalt alloy, base, Co 56-65,Cr 27.0-31.0,W 3.5-4.5,Fe 0-3.0,Ni 0-3.0,Mo

0-1.5,Si 0-1.5,C 0.9-1.4,Mn 0-1.0 (UNS R30006) (9CI) (CA INDEX NAME)
OTHER CA INDEX NAMES:
CN Carbon alloy, nonbase, Co 56-65,Cr 27.0-31.0,W 3.5-4.5,Fe 0-3.0,Ni 0-3.0,Mo 0-1.5,Si 0-1.5,C 0.9-1.4,Mn 0-1.0 (UNS R30006)
CN Chromium alloy, nonbase, Co 56-65,Cr 27.0-31.0,W 3.5-4.5,Fe 0-3.0,Ni 0-3.0,Mo 0-1.5,Si 0-1.5,C 0.9-1.4,Mn 0-1.0 (UNS R30006)
CN Iron alloy, nonbase, Co 56-65,Cr 27.0-31.0,W 3.5-4.5,Fe 0-3.0,Ni 0-3.0,Mo 0-1.5,Si 0-1.5,C 0.9-1.4,Mn 0-1.0 (UNS R30006)
CN Manganese alloy, nonbase, Co 56-65,Cr 27.0-31.0,W 3.5-4.5,Fe 0-3.0,Ni 0-3.0,Mo 0-1.5,Si 0-1.5,C 0.9-1.4,Mn 0-1.0 (UNS R30006)
CN Molybdenum alloy, nonbase, Co 56-65,Cr 27.0-31.0,W 3.5-4.5,Fe 0-3.0,Ni 0-3.0,Mo 0-1.5,Si 0-1.5,C 0.9-1.4,Mn 0-1.0 (UNS R30006)
CN Nickel alloy, nonbase, Co 56-65,Cr 27.0-31.0,W 3.5-4.5,Fe 0-3.0,Ni 0-3.0,Mo 0-1.5,Si 0-1.5,C 0.9-1.4,Mn 0-1.0 (UNS R30006)
CN Silicon alloy, nonbase, Co 56-65,Cr 27.0-31.0,W 3.5-4.5,Fe 0-3.0,Ni 0-3.0,Mo 0-1.5,Si 0-1.5,C 0.9-1.4,Mn 0-1.0 (UNS R30006)
CN Tungsten alloy, nonbase, Co 56-65,Cr 27.0-31.0,W 3.5-4.5,Fe 0-3.0,Ni 0-3.0,Mo 0-1.5,Si 0-1.5,C 0.9-1.4,Mn 0-1.0 (UNS R30006)
OTHER NAMES:
CN 60Co29Cr4.5W
CN Acrite Co 40
CN Aircoloy 6
CN Akrit Co40
CN Alloy 6
CN AMS 5373
CN AMS 5387
CN AMS 5788
CN APM6615
CN Co29Cr4.5WC1.2
CN COBSTEL 6
CN CoCr28W5
CN CoCr29W5C1.3
CN CoCrA
CN Corolit 6
CN Corosint CoCr6
CN ERCoCr-A
CN Hardex 6
CN Haynes 6
CN Haynes Stellite 6
CN HS6
CN KC 26W
CN KSP-6
CN Milit 6
CN R30006
CN RCoCr-A
CN Stellite 6
CN Stellite alloy 6
CN Stellite HS6
CN Stellite No. 6
CN Stellite WR6
CN STL6
CN Stoody 6
CN UNS R30006
CN V3K
CN Vertx Co-6
CN Wallex 6
CN Wallex No. 6
CN X110CoCrW63 28 4
DR 12611-93-7, 56589-53-8, 50957-53-4, 51881-01-7, 61333-15-1, 71851-24-6, 154439-53-9, 85132-15-6, 160371-07-3, 197921-95-2
MF C . Co . Cr . Fe . Mn . Mo . Ni . Si . W
CI AYS
LC STN Files: CA, CAPLUS, IFICDB, IFIPAT, IFIUDB, PROMT, TOXCENTER, USPATFULL

DT.CA CAplus document type: Conference; Dissertation; Journal; Patent; Report
RL.P Roles from patents: PREP (Preparation); PROC (Process); PRP (Properties); USES (Uses); NORL (No role in record)
RL.NP Roles from non-patents: BIOL (Biological study); MSC (Miscellaneous); PREP (Preparation); PROC (Process); PRP (Properties); RACT (Reactant or reagent); USES (Uses); NORL (No role in record)
RLD.NP Roles for non-specific derivatives from non-patents: PROC (Process); PRP (Properties); USES (Uses)

Component	Component Percent	Component Registry Number
Co	56 - 65	7440-48-4
Cr	27.0 - 31.0	7440-47-3
W	3.5 - 5.5	7440-33-7
Fe	0 - 3.0	7439-89-6
Ni	0 - 3.0	7440-02-0
Mo	0 - 1.5	7439-98-7
Si	0 - 1.5	7440-21-3
C	0.9 - 1.4	7440-44-0
Mn	0 - 1.0	7439-96-5

599 REFERENCES IN FILE CA (1907 TO DATE)
1 REFERENCES TO NON-SPECIFIC DERIVATIVES IN FILE CA
599 REFERENCES IN FILE CAPLUS (1907 TO DATE)

REFERENCE 1

AN 142:139954 CA
TI Advanced erosion protection technology provides sustained low NOx burner performance
AU Goebel, Douglas; Saari, Michael; Courtemanche, Bonnie; Trunkett, K. Scott
CS We Energies, Milwaukee, WI, 53203, USA
SO Proceedings of the International Technical Conference on Coal Utilization & Fuel Systems (2004), 29th(Vol. 1), 259-269
CODEN: PTCSFT
PB Coal Technology Association
DT Journal
LA English
CC 59-4 (Air Pollution and Industrial Hygiene)
Section cross-reference(s): 51
AB Elec. power generators are experiencing the most complex confluence of market pressures in the history of the industry. Environmental regulations are more strict than ever, forcing producers to make substantial capital investments in emissions conformance, while de-regulation pressures are making available maintenance dollars ever more scarce. The threat of non-conformance penalties weighs heavily against the Wall Street pressures, and decisions between capital expenditures, potential fines, and everyday equipment maintenance becomes a precarious balancing act. Current, high-cost of liquefied natural gas combined with transmission bottlenecks places low NOx coal-fired mega-watts at a premium, particularly in regions where generating capacity closely matches demand. This increased value of low NOx mega-watts puts further pressure on personnel to maintain peak performance of NOx management systems. After an elec. power generator invests in NOx reduction technologies to achieve conformance, it is faced with maintaining the equipment to ensure NOx rates remain within specified tolerance. Pulverized coal traveling at high velocity through coal burners and burner tips typically produces significant component erosion, causing owners to repeatedly replace parts, even entire burner assemblies. During the period between repairs, changes in burner geometry caused by excessive erosion can impact combustion characteristics, resulting in upward-trending NOx emissions. The most advanced low-NOx burner technologies use a unique tungsten carbide cladding applied through an infiltration brazing process to protect

components against erosion wear, substantially increasing burner life and maintaining combustion characteristics for sustained low NOx performance. Exhaustive laboratory analyses used to determine the best wear solution for this extreme application, how it is applied, and performance results of these burners in actual operation after >2 years service are presented.

ST coal fired power generation advanced erosion protection boiler; low NOx boiler burner performance erosion protection; air pollution control coal fired power generation boiler

IT Power
    (coal-fired generation of; advanced erosion protection technol. to ensure sustained performance of low-NOx burners in pulverized coal-fired power generation boilers)

IT Flue gases
    Particles
    (coal-fired power generation; advanced erosion protection technol. to ensure sustained performance of low-NOx burners in pulverized coal-fired power generation boilers)

IT Erosion (wear)
    (control of; advanced erosion protection technol. to ensure sustained performance of low-NOx burners in pulverized coal-fired power generation boilers)

IT Air pollution
    (control; advanced erosion protection technol. to ensure sustained performance of low-NOx burners in pulverized coal-fired power generation boilers)

IT Boilers
    (low-NOx coal-fired power generation; advanced erosion protection technol. to ensure sustained performance of low-NOx burners in pulverized coal-fired power generation boilers)

IT Bituminous coal
    Subbituminous coal
    RL: NUU (Other use, unclassified); USES (Uses)
    (power generation from combustion of; advanced erosion protection technol. to ensure sustained performance of low-NOx burners in pulverized coal-fired power generation boilers)

IT 7439-97-6, Mercury, occurrence 11104-93-1, Nitrogen oxide, occurrence 12624-32-7, Sulfur oxide
    RL: POL (Pollutant); OCCU (Occurrence)
    (advanced erosion protection technol. to ensure sustained performance of low-NOx burners in pulverized coal-fired power generation boilers)

IT 409-21-2, Silicon carbide, uses 11068-68-1, ASTM A532-I-A 11105-35-4, Stellite 6 11130-73-7, Tungsten carbide 12638-07-2, Stellite 31 37195-30-5 68519-10-8, ASTM A532-II-C 358751-59-4, Conforma Clad WC219 824413-81-2, Stoody 101HC 824413-91-4, SA1750CR
    RL: NUU (Other use, unclassified); USES (Uses)
    (burner erosion protection; advanced erosion protection technol. to ensure sustained performance of low-NOx burners in pulverized coal-fired power generation boilers)

REFERENCE 2

AN 142:78300 CA

TI Correlation between melt pool temperature and clad formation in pulsed and continuous wave ND:YAG laser cladding of stellite 6

AU Sun, Shoujin; Durandet, Yvonne; Brandt, Milan

CS Industrial Laser Applications Laboratory, Industrial Research Institute Swinburne, Swinburne University of Technology, Hawthorn, Vic, 3122, Australia

SO Laser Institute of America [Publication] (2004), 96(Conference Proceedings - 1st Pacific International Conference on Applications of Lasers and Optics, 2004), 136-141
    CODEN: LIAAED

PB Laser Institute of America

DT Journal; (computer optical disk)
LA English
CC 56-9 (Nonferrous Metals and Alloys)
Section cross-reference(s): 73
AB The melt pool temperature in pulsed laser cladding of stellite 6 was measured with a 2-color pyrometer. The pulse peak temperature (Tp), durations when the melt pool temperature is above the m.ps. of stellite 6 powder (t1) and substrate
(t2) in each pulse have been calculated and the effects of laser operating parameters (pulse energy, pulse frequency and spot overlap) on these values have been examined Tp only depends on the pulse energy and dets. the melt pool size (DM), whereas the ratios of both t1 and t2 to the pulse length increase with pulse energy, pulse frequency (f) and spot overlap. The predictions of clad height, the total thickness of clad layer and dilution by Tp, t1 and t2 are given for both pulsed and continuous wave (CW) laser cladding of stellite 6. Comparison between the exptl. data and prediction has been made. Thick clad layer with low level of dilution requires higher value of the product of t1·f, longer beam interaction time (*au) and large DM.
ST cobalt alloy laser cladding continuous wave pulse
IT Laser radiation
(continuous wave; correlation between melt pool temperature and clad formation in pulsed and continuous wave ND:YAG laser cladding of stellite 6)
IT Laser cladding
(correlation between melt pool temperature and clad formation in pulsed and continuous wave ND:YAG laser cladding of stellite 6)
IT Laser radiation
(pulsed; correlation between melt pool temperature and clad formation in pulsed and continuous wave ND:YAG laser cladding of stellite 6)
IT 11105-35-4, Stellite 6
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(correlation between melt pool temperature and clad formation in pulsed and continuous wave ND:YAG laser cladding of stellite 6)
RE.CNT 10 THERE ARE 10 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Colaco, R; High Temp Chem Processes 1994, V3, P21 CAPLUS
(2) De Hosson, J; Surface Engineering 1997, V13, P471 CAPLUS
(3) Frenk, A; Metallurgical and Materials Transactions 1997, V28B, P501 CAPLUS
(4) Kathuria, Y; Surface and Coatings Technology 2000, V132, P262 CAPLUS
(5) Peters, T; Proceedings of EPRI 2002, PST7
(6) Shepeleva, L; Surface and Coatings Technology 2000, V125, P45 CAPLUS
(7) So, H; Wear 1996, V192, P78 CAPLUS
(8) Steen, W; Proceedings of SPIE: High power laser and their industrial applications 1986, V650, P226 CAPLUS
(9) Sun, S; Proceedings of WTIA Surface Engineering Conference 2003
(10) Weerasinghe, V; Metal construction 1987, V19, P581 CAPLUS

REFERENCE 3

AN 141:353400 CA
TI Reactions of Co based and Fe based superalloys with a molten Zn-Al alloy
AU Zhang, K.; Tang, N.-Y.
CS Product Technology Centre, Teck Cominco Metals Ltd, Mississauga, ON, L5K 1B4, Can.
SO Materials Science and Technology (2004), 20(6), 739-746
CODEN: MSCTEP; ISSN: 0267-0836
PB Maney Publishing
DT Journal
LA English
CC 56-6 (Nonferrous Metals and Alloys)
AB Static corrosion tests of Co based and Fe based superalloys were carried out at 470°C in a molten Zn galvanizing alloy containing about 0.22 weight% Al and saturated with Fe for various lengths of time up to 168 h (one

week). The superalloys readily reacted with the galvanizing alloy and CoAl or Fe2Al5 formed initially on the specimen surfaces. The reaction front moved towards the depth of the test pieces with increasing dipping time, leaving behind a Zn-rich reaction zone. At the same time, other intermetallic phases formed in the Zn-rich zone and on the surfaces of the samples. These intermetallic phases are complex in nature and vary with the alloys. In Stellite 6, Fe aluminide was prominently present in the vicinity of surviving carbide particles in the Zn-rich zone of the sample tested for 168 h. Some areas of iron aluminide were intimately connected to Fe2Al5 particles building up on the sample surface. This observation suggests that the iron aluminide formed in the reaction zone provided ideal sites for the attachment of Fe2Al5 particles pre-existing in the melt onto the sample surfaces. It also served as nucleation and growth sites for the Fe2Al5 compound on the sample surface. This is one possible mechanism of dross buildup on submerged hardware made of this type of Co based superalloy in continuous galvanizing.

ST superalloy hot dip galvanization interfacial reaction; cobalt superalloy hot dip galvanization interfacial reaction; iron superalloy hot dip galvanization interfacial reaction

IT Galvanizing
(hot-dip; reactions of Co-based and Fe-based superalloys with molten Zn-Al in continuous hot-dip galvanization process)

IT Interfacial reaction
(reactions of Co-based and Fe-based superalloys with molten Zn-Al in continuous hot-dip galvanization process)

IT Superalloys
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(reactions of Co-based and Fe-based superalloys with molten Zn-Al in continuous hot-dip galvanization process)

IT 12043-79-7 39308-06-0
RL: FMU (Formation, unclassified); PRP (Properties); FORM (Formation, nonpreparative)
(hot-dip galvanization bath; reactions of Co-based and Fe-based superalloys with molten Zn-Al in continuous hot-dip galvanization process)

IT 11105-35-4, Stellite 6 775342-61-5, T-500M 775342-63-7, Tribaloy T-400C
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(reactions of Co-based and Fe-based superalloys with molten Zn-Al in continuous hot-dip galvanization process)

IT 12003-14-4 12043-58-2 12190-91-9, Chromium silicide (Cr2Si)
RL: FMU (Formation, unclassified); PRP (Properties); FORM (Formation, nonpreparative)
(surface reaction product; reactions of Co-based and Fe-based superalloys with molten Zn-Al in continuous hot-dip galvanization process)

RE.CNT 16 THERE ARE 16 CITED REFERENCES AVAILABLE FOR THIS RECORD
(1) Brunnock, M; Ironmaking Steelmaking 1996, V23, P171 CAPLUS
(2) Brunnock, M; Proc Galvanizers Association 1996, P3
(3) Chang, K; Proc Galvatech'01 2001, P270 CAPLUS
(4) Gay, B; Proc Galvatech'01 2001, P262 CAPLUS
(5) Horstmann, D; Proc 6th Int Conf on ` Hot dip galvanising' 1961, P319
(6) Liu, X; Progress Reports, IMPH Annual Project Review Meeting 2003
(7) Nakagawa, M; Tetsu-to-Hagane 1995, V81(10), P47
(8) Nakagawa, M; Tetsu-to-Hagane 1996, V81(3), P226
(9) Nakahira, H; Bull Jpn Inst Met 1992, V31, P446
(10) Seong, B; Proc 1st ASM Int Surface Engineering and the 13th IFHTSE Congr 2002, P555
(11) Sikka, V; Progress Reports, IMPH Annual Project Review Meeting 2003
(12) Song, J; Wear 1997, V210, P291 CAPLUS

(13) Tang, N; Proc Int Symp on ` Zinc-coated steel', Iron & Steel Society 44th Mechanical Working and Steel Processing, and 8th International Steel Rolling Conf 2002, P1285
(14) Tani, K; ISIJ Int 1994, V34, P822 CAPLUS
(15) Tomita, T; ISIJ Int 1993, V33, P982 CAPLUS
(16) Zhang, K; Metall Mater Trans A 2003, V34A, P2687

REFERENCE 4

AN 141:318184 CA
TI Molybdenum-boride based powder for thermal-spray coating resistant to molten metal
IN Itsukaichi, Tsuyoshi; Osawa, Satoru
PA Fujimi Incorporated, Japan
SO Eur. Pat. Appl., 13 pp.
CODEN: EPXXDW
DT Patent
LA English
IC ICM C23C004-06
CC 56-4 (Nonferrous Metals and Alloys)
FAN.CNT 1

	PATENT NO.	KIND	DATE	APPLICATION NO.	DATE
PI	EP 1464720	A1	20041006	EP 2004-7798	20040331
	R: AT, BE, CH, DE, DK, ES, FR, GB, GR, IT, LI, LU, NL, SE, MC, PT, IE, SI, LT, LV, FI, RO, MK, CY, AL, TR, BG, CZ, EE, HU, PL, SK				
	JP 2004300555	A2	20041028	JP 2003-97038	20030331
	US 2004194662	A1	20041007	US 2004-810268	20040326

PRAI JP 2003-97038 20030331
AB Thermal-spray powder contains Mo 30-70, B 5-12, Co 10-40 (or Ni 15-45), and Cr 15-25% by weight with impurities and minor components at <5%. The powder is typically manufactured by granulation of the feed mixture containing powdered
Mo boride (average particle size 4.5 μm), Stellite-6 Co-alloy (7 μm), and CrB_2 (4.5 μm). The powder is suitable for coating of heat-resistant substrates (especially tool steel) by high-velocity flame spraying, followed by sealing with BN and silicone polymers with ceramic conversion. The adherent wear-resistant coating typically contains Co 26.0, B 8.5, Cr 18.2, W 2.0, and C 0.4% by weight with Mo as the balance, vs. low wear resistance for the similar coating containing B 11.4 and Cr 26%.
ST molybdenum boride alloy powder thermal spray coating; thermal spray coating molybdenum chromium boride alloy powder
IT Polysiloxanes, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(coating, sealing with; molybdenum-boride alloy powder for thermal spray coating resistant to molten metal)
IT Coating process
(thermal spraying; molybdenum-boride alloy powder for thermal spray coating resistant to molten metal)
IT 10043-11-5, Boron nitride, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(coating, sealing with; molybdenum-boride alloy powder for thermal spray coating resistant to molten metal)
IT 7429-90-5, Aluminum, uses
RL: TEM (Technical or engineered material use); USES (Uses)
(molten, coating resistant to; molybdenum-boride alloy powder for thermal spray coating resistant to molten metal)
IT 11105-35-4, Stellite 6 12626-91-4, Molybdenum boride
RL: MOA (Modifier or additive use); USES (Uses)
(powder, coating mixture containing; molybdenum-boride alloy powder for thermal spray coating resistant to molten metal)
IT 769136-10-9 769136-11-0 769136-12-1 769136-14-3 769136-16-5
769136-17-6 769136-18-7 769136-19-8 769136-20-1 769136-21-2
769136-22-3 769136-23-4

RL: TEM (Technical or engineered material use); USES (Uses)
(powder, for coating; molybdenum-boride alloy powder for thermal spray coating resistant to molten metal)

IT 769136-08-5 769136-09-6
RL: TEM (Technical or engineered material use); USES (Uses)
(powder, for thermal-spray coating; molybdenum-boride alloy powder for thermal spray coating resistant to molten metal)

IT 12741-56-9, SKD61
RL: DEV (Device component use); USES (Uses)
(tool, coating of; molybdenum-boride alloy powder for thermal spray coating resistant to molten metal)

REFERENCE 5

AN 141:318053 CA
TI Effects of silicon on the wear behavior of cobalt-based alloys at elevated temperature
AU Celik, Halis; Kaplan, Mehmet
CS Technical Education Faculty, Firat University, Elazig, Metal Egitimi Bolumu, 23119, Turk.
SO Wear (2004), 257(5-6), 606-611
CODEN: WEARAH; ISSN: 0043-1648
PB Elsevier B.V.
DT Journal
LA English
CC 56-10 (Nonferrous Metals and Alloys)
AB Effects of silicon on the abrasive wear behavior at elevated temps. of cobalt-based alloys such as Co-28Cr-4W-1.1C-2.2Si, Co-28Cr-4W-1.1C-3.1Si, Co-28Cr-4W-1.1C-4.2Si, resp. were studied. Wear resistance of the materials were measured by a two body pin-on-disk wear tester with SiC and Al2O3 abrasives. The hardness of stellite 6 alloy increased with silicon addition Wear resistance of stellite 6 with silicon addition has increased at low temperature but, decreased at high temperature Microstructure of samples was investigated by optical and SEM techniques.
ST cobalt alloy abrasive wear silicon influence
IT Wear
(abrasive; effects of silicon on wear behavior of cobalt-based alloys at elevated temperature)
IT Hardness (mechanical)
Microstructure
(effects of silicon on wear behavior of cobalt-based alloys at elevated temperature)
IT Wear
(resistance; effects of silicon on wear behavior of cobalt-based alloys at elevated temperature)
IT 409-21-2, Silicon monocarbide, uses 1344-28-1, Alumina, uses
RL: NUU (Other use, unclassified); USES (Uses)
(counterpart; effects of silicon on wear behavior of cobalt-based alloys at elevated temperature)
IT 11105-35-4, Stellite 6 767355-65-7 767355-66-8 767355-67-9
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(effects of silicon on wear behavior of cobalt-based alloys at elevated temperature)
RE.CNT 7 THERE ARE 7 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Anon; ASM Handbook, Casting, Cobalt-Base Alloys 1992, V15, P811
(2) Antony, K; J Met 1983, V35, P52 CAPLUS
(3) Atamert, S; Metall Trans A 1989, V2017, P1037
(4) Brooks, C; Heat Treatment, Structure and Properties of Nonferrous Alloys 1990, P229
(5) Celik, H; PhD Thesis, Istanbul Technical University 1991
(6) Izciler, M; J Mater Process Technol 2000, V105, P237
(7) Schwarz, W; Mater Sci Eng A 1997, V226-228, P1098

REFERENCE 6

AN 141:317684 CA
TI Adhesion testing of thermally sprayed and laser deposited coatings
AU Hjornhede, Anders; Nylund, Anders
CS Department of Materials Science and Engineering, Chalmers University of Technology, Goteborg, SE 412 96, Swed.
SO Surface and Coatings Technology (2004), 184(2-3), 208-218
CODEN: SCTEEJ; ISSN: 0257-8972
PB Elsevier Science B.V.
DT Journal
LA English
CC 55-6 (Ferrous Metals and Alloys)
Section cross-reference(s): 57
AB Com. coatings were deposited on Fe1Cr0.5Mo low-alloy steel tubes by using arc spraying, high-velocity oxy fuel thermal spraying and laser cladding. The adhesion strength was determined by two methods, acoustic emission and a combination of four-point bending and metallog. The agreement between the results obtained from the two different exptl. techniques was satisfactory. Laser coatings showed no delamination for strains ≤15%, while coatings deposited by arc spraying and thermal spray processes delaminated in the strain intervals 1.4-1.9 and 0.8-1.8%, resp. The suggested delamination mechanism is the initial formation of a radial crack in the coating after which the coating/substrate interface comes under an increased tensile load and fractures. Arc sprayed coatings of Metcoloy 2 (Fe13Cr) mixed with the binder Ni-20Al show a greatly increased adhesion strength if the splat size was sufficiently large. The delamination interval increases to 10.5-11.5%. However, for small splats the effect is eliminated.
ST adhesion thermally sprayed laser deposited coating steel
IT Adhesion, physical
Coating materials
Laser cladding
(adhesion of thermally sprayed and laser deposited coatings on steel)
IT Coating process
(thermal spraying; adhesion of thermally sprayed and laser deposited coatings on steel)
IT 11105-35-4, Stellite 6 12629-02-6, Stellite 21 12682-01-8, Inconel 625 39411-23-9, 1Cr0.5Mo, properties 68565-87-7, Metcoloy 2 180686-00-4 , Amperit 526 386703-03-3, Metco 3007 769122-06-7, Duroc 5177
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(adhesion of thermally sprayed and laser deposited coatings on steel)
IT 12070-08-5, Titanium monocarbide 12617-42-4
RL: PRP (Properties); TEM (Technical or engineered material use); USES (Uses)
(adhesion to steel of thermally sprayed and laser deposited coatings containing)
RE.CNT 14 THERE ARE 14 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Almond, D; Thin Solid Films Metall Prot Coat 1983, V108, P439 CAPLUS
(2) Arata, Y; Trans JWRI 1984, V13(2), P193
(3) Clare, J; ASM Handbook -- Friction, Lubrication and Wear Technology 1992, V18, P361
(4) Dalmas, D; Comptes rendus de l'academie des sciences serie il fascicule chimie 2001, V4(5), P345 CAPLUS
(5) Hjornhede, A; Proceedings of fifth International Symposium on High-Temperature Corrosion and Protection of Materials, 2000 2001, P507 CAPLUS
(6) Li, C; Proceeding of 1st International Thermal Spray Conference 2000
(7) Ma, X; Surf Coat Technol 2001, V139, P55 CAPLUS
(8) Mizutani, Y; NDT&E Int 2000, V33, P101 CAPLUS
(9) Nafari, A; Licenciate Thesis, Chalmers, Goteborg 2003
(10) Qi, G; Compos Sci Technol 1997, V57, P389 CAPLUS

(11) Qi, G; NDT&E Int 2000, V33, P133
(12) Tarkpea, P; Ytbellaggningar for erosionsskydd i fiuidbaddar 1998
(13) Tucker, R; ASM-Handbook-Surface Engineering 1994, V5, P497
(14) Vilar, R; Int J Powder Metall 2001, V37(2), P31 CAPLUS

REFERENCE 7

AN 141:214312 CA
TI Wear performance and activity reduction effect of Co-free valves in PWR environment
AU Bahn, Chi Bum; Han, Byoung Chan; Bum, Jin Sin; Hwang, Il Soon; Lee, Chan Bock
CS Department of Nuclear Engineering, Seoul National University, Seoul, 151-742, S. Korea
SO Nuclear Engineering and Design (2004), 231(1), 51-65
CODEN: NEDEAU; ISSN: 0029-5493
PB Elsevier Science B.V.
DT Journal
LA English
CC 71-4 (Nuclear Technology)
Section cross-reference(s): 55, 56
AB Co-based hardfacing alloys exposed to PWR primary coolant may be replaced with Co-free alloys to lower occupational radiation exposure. To evaluate the viability of Co-free hardfacing alloys, the authors conducted hot-H2O tests for gate valves hardfaced with NOREM 02 (Fe-base), Deloro 50 (Ni-base), and Stellite 6 (Co-base). Using a high flow test loop, on-off cycling tests were conducted in 280° H2O. NOREM 02 exhibited galling and excessive leak after 1000 cycle test whereas no leakage was developed with Deloro 50 after 2000 cycles. To estimate the activity reduction effect of Co-free hardfacing alloys, an existing activity transport model was modified. The main contributor of Co activity buildup is the corrosion of steam generator (SG) tubing. The Korean Next Generation Reactor (APR-1400) tubed with alloy 690 having a reduced Co impurity allowance is expected to have 73% lower Co activity on SG surface compared with the case of alloy 600 tubing. The complete replacement of Stellite 6 with Co-free hardfacing alloys is expected to cut addnl. 5% of activity which may be too small to justify the risk of galling and leakage development as revealed by the hot-H2O test.
ST wear resistant valve PWR reactor coolant
IT Pressurized water nuclear reactors
(cooling systems; wear performance and activity reduction effect of Co-free valves in PWR environment)
IT Valves
(gate; wear performance and activity reduction effect of Co-free valves in PWR environment)
IT Nuclear reactor cooling systems
(pressurized-water; wear performance and activity reduction effect of Co-free valves in PWR environment)
IT Wear
(resistance; wear performance and activity reduction effect of Co-free valves in PWR environment)
IT Hardfacing
(wear performance and activity reduction effect of Co-free valves in PWR environment)
IT 11105-35-4, Stellite 6 54385-90-9, Alloy 690 112814-39-8, Deloro 50 201011-51-0, NOREM 02
RL: NUU (Other use, unclassified); USES (Uses)
(wear performance and activity reduction effect of Co-free valves in PWR environment)
RE.CNT 19 THERE ARE 19 CITED REFERENCES AVAILABLE FOR THIS RECORD
(1) Anon; ICRP publication 1991, V60
(2) Bergmann, C; EPRI Report 1984, NP-3445
(3) Beslu, P; Proceedings of the Water Chemistry of Nuclear Reactor Systems 4 1986, P52

(4) Cho, S; Nucl Eng Des 2000, V201, P259 CAPLUS
(5) International Atomic Energy Agency; Occupational Exposures at Nuclear Power Plants: Twelfth Annual Report of the ISOE Programme, 2002 2004, NEA No 4418
(6) Kang, S; EPRI Report 1985, NP-4246
(7) Kim, J; Wear 2000, V237, P217 CAPLUS
(8) Kim, S; J Nuclear Mater 2001, V288, P163 CAPLUS
(9) Lee, C; PhD Thesis, Massachusetts Institute of Technology 1990
(10) Lee, C; Proceedings of the International Conference on Water Chemistry of Nuclear Reactors Systems 2002
(11) Marchetto, C; Proceedings of the Water Chemistry of Nuclear Reactor Systems 8 2000, V1, P224
(12) Metge, M; Proceedings of the Water Chemistry of Nuclear Reactor Systems 4 1986, P71 CAPLUS
(13) Murphy, E; EPRI Report 1992, TR-100601
(14) Murphy, E; Proceedings of 5th International Symposium on Environmental Degradation of Materials in Nuclear Power Systems-Water Reactors 1991, P311
(15) Ocken, H; Nucl Technol 1985, V68, P18 CAPLUS
(16) Ocken, H; Surf Coat Technol 1995, V76-77, P456 CAPLUS
(17) Stellwag, B; Corros Sci 1998, V40, P337 CAPLUS
(18) Wood, C; Progress Nucl Energy 1987, V19, P241 CAPLUS
(19) Yonezawa, T; Proceedings of the International Symposium FONTEVRAUD III 1994, V1, P116

REFERENCE 8

AN 141:193467 CA
TI Laser cladding on a carbon steel by continual beam with modelling of the temperature field
AU Stranyanek, Martin; Chmelickova, Hana
CS Joint Laboratory of Optics of Palacky University, Physical Institute of the Academy of Sciences of Czech Republic, Olomouc, 772 07, Czech Rep.
SO Proceedings of SPIE-The International Society for Optical Engineering (2004), 5445(Microwave and Optical Technology 2003), 368-371
CODEN: PSISDG; ISSN: 0277-786X
PB SPIE-The International Society for Optical Engineering
DT Journal
LA English
CC 55-9 (Ferrous Metals and Alloys)
AB Laser cladding is one of the technologies of material surface treatment. A series of laser-clad specimens were produced using continual 2,5 kW CO2 laser. There is introduced a description of the powder injection laser cladding method in the present paper. For some numerical calcns. of laser beam induced temperature field in treated material were used the finite difference method and the finite element method. Results of this modeling led to an optimization of cladding process parameters. Some layers of Ni-based alloy K50, Stellit6 alloy, and SiC powders were applied on low-carbon CSN 11 373 and CSN 12 010 steels. Shape characteristics and some properties such as microhardness of clad layers in comparison with substrate values were analyzed.
ST carbon steel laser cladding temp field
IT Laser cladding
Temperature
(laser cladding on C steel by continual beam with modeling of temperature field)
IT 409-21-2, Silicon carbide, processes 11105-35-4, Stellite 6 50813-06-4, Nickel alloy, Ni,B,C,Cr,Fe,Si (VUZ K-50)
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PROC (Process)
(laser cladding on C steel by continual beam with modeling of temperature field)
IT 37312-61-1, CSN 11 373, processes 37373-73-2, CSN 12 010, processes
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); PRP (Properties); PROC (Process)
(laser cladding on C steel by continual beam with modeling of temperature

field)
RE.CNT 6 THERE ARE 6 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) de Damborenea, S; Surface & coatings technology 1998, 100-101, P377
(2) Schneider, M; Laser cladding 1998
(3) Sharp, M; Mathematical modelling of continuous wave CO2 laser processing of materials 1986
(4) Steen, W; Laser Material Processing 1991
(5) Stranyanek, M; Powder cladding of low-carbon steel by CO2 laser 2000, research report no 209/SLO/2000
(6) Weerasinghe, V; Laser cladding of flat plates 1984

REFERENCE 9

AN 141:163806 CA
TI Tribocorrosion of stellite 6 in sulphuric acid medium: electrochemical behaviour and wear
AU Benea, L.; Ponthiaux, P.; Wenger, F.; Galland, J.; Hertz, D.; Malo, J. Y.
CS Laboratoire C.F.H., Ecole Centrale Paris, Chatenay-Malabry, F-92290, Fr.
SO Wear (2004), 256(9-10), 948-953
CODEN: WEARAH; ISSN: 0043-1648
PB Elsevier Science B.V.
DT Journal
LA English
CC 72-6 (Electrochemistry)
Section cross-reference(s): 56
AB Tribocorrosion of stellite 6 in sulfuric acid was studied with a pin-on-disk tribometer through test conditions of intermittent friction. The occurrence of a mechanism involving mech. depassivation during friction and further repassivation during the latency period between two successive friction steps was demonstrated. Polarization curves measurements and wear measurements by weight loss together with microtopog. surveys of the wear track allowed to determine the relation giving the evolution of the wear with the duration of the latency period, and the kinetic law ruling the electrochem. repassivation mechanism.
ST stellite 6 tribocorrosion wear electrochem sulfuric acid
IT Wear
(abrasive; tribocorrosion of stellite 6 in sulfuric acid medium)
IT Surface structure
(of stellite 6 after friction test in sulfuric acid medium)
IT Cyclic voltammetry
(of stellite 6 in sulfuric acid medium)
IT Corrosion
(tribocorrosion of stellite 6 in sulfuric acid medium)
IT 11105-35-4, Stellite 6
RL: CPS (Chemical process); DEV (Device component use); PEP (Physical, engineering or chemical process); PROC (Process); USES (Uses)
(tribocorrosion of stellite 6 in sulfuric acid medium)
IT 7664-93-9, Sulfuric acid, reactions
RL: CPS (Chemical process); PEP (Physical, engineering or chemical process); RCT (Reactant); PROC (Process); RACT (Reactant or reagent)
(tribocorrosion of stellite 6 in sulfuric acid medium)
RE.CNT 3 THERE ARE 3 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Ford, F; Proceedings of the Third International Symposium on Environmental Degradation of Materials in Nuclear Power Systems-Water Reactors 1987, P789
(2) Garcia, D; Wear 2001, V249, P452
(3) Lemaire, E; Wear 2001, V249(5/6), P338

REFERENCE 10

AN 141:160598 CA
TI Mechanical properties and microstructure of HVOF sprayed Co and Ni alloy coatings
AU Zhang, D.; Harris, S. J.; McCartney, D. G.
CS University of Nottingham, Nottingham, UK

SO Thermal Spray 2003: Advancing the Scienceand Applying the Technology, Proceedings of the International Thermal Spray Conference, Orlando, FL, United States, May 508, 2003 (2003), Volume 1, 829-836. Editor(s): Marple, Basil R.; Moreau, Christian. Publisher: ASM International, Materials Park, Ohio.
CODEN: 69EUUZ; ISBN: 0-87170-785-3

DT Conference

LA English

CC 56-6 (Nonferrous Metals and Alloys)

AB A high velocity oxy-fuel spraying system using liquid fuel (HVOLF) has produced Stellite 6 (CoCrWC) and NiCoCrAlY coatings from gas atomized powders of both alloys. Comparative coatings were prepared by weld Overlay (Stellite 6) and vacuum plasma spraying (VPS) of NiCoCrAlY. The original powders and coatings were characterized by SEM and x-ray diffraction (x-ray diffraction). The presence or absence of cored dendritic microstructures in etched surfaces was used to interpret the degree of melting which took place during spraying, i.e. >80% in VPS and <20% in HVOLF. Low levels of oxide were formed in HVOLF coatings due to the reduced level of thermal transfer during the short heating cycle involved in spraying. For the same reason less melting occurred which permitted sufficient plastic deformation of the solid fraction to occur, reducing voidage between particles and then allowing the liquid fraction to weld them together. This pattern of short cycle heating with both NiCoCrAlY and Stellite 6 particles influenced second phase formation. In NiCoCrAlY coatings the β (Co Ni Al) phase remained as relatively coarse ppts. in the as - sprayed condition while in Stellite 6 little carbide eutectic formed. HVOLF spraying can produce coatings with different hardness values when compared with VPS coatings and weld overlays. This may widen the range of coating applications as well as reduce costs.

ST cobalt nickel alloy coating oxyfuel spraying microstructure mech property

IT Hardness (mechanical)
Heat treatment
Microstructure
(mech. properties and microstructure of HVOF sprayed Co and Ni alloy coatings)

IT Spraying
(oxy-fuel; mech. properties and microstructure of HVOF sprayed Co and Ni alloy coatings)

IT Coating materials
(powder; mech. properties and microstructure of HVOF sprayed Co and Ni alloy coatings)

IT 11105-35-4, Stellite 6 80377-27-1 731016-49-2, Aluminum 8.3, chromium 26, cobalt 33, nickel 32, yttrium 0.5
RL: PEP (Physical, engineering or chemical process); PRP (Properties); PYP (Physical process); PROC (Process)
(mech. properties and microstructure of HVOF sprayed Co and Ni alloy coatings)

RE.CNT 13 THERE ARE 13 CITED REFERENCES AVAILABLE FOR THIS RECORD

(1) Brandl, W; Surface and Coating Technology 1998, V108/109, P10
(2) Gruner, H; Thin Solid Films 1984, V118(4), P409 CAPLUS
(3) Gudmundsson, B; Materials Science and Engineering 1988, V100, P207 CAPLUS
(4) Jackson, M; NBS Special Publication 1977, VSP496
(5) Jackson, M; Superalloys: Metallurgy and Manufacture 1976, P341 CAPLUS
(6) Kaufman, L; Metal Trans A 1975, V6, P2123
(7) Lugscheider, E; Surface and Coating Technology 1998, V108/109, P16
(8) Meyer, P; Proc Int Thermal Spray Conference 1995, P217 CAPLUS
(9) Nuutinen, S; Proc Int Thermal Spray Conference 2001, P661 CAPLUS
(10) Provot, X; Proc National Thermal Spray Conference 1993, P159 CAPLUS
(11) Yamasaki, R; Proc Int Thermal Spray Conference 1995, P863 CAPLUS
(12) Zhang, D; Materials Science and Engineering (A) 2003, V344/1-2, P45
(13) Zhang, D; Proc Int Thermal Spray Conference 2002, P500